the OIL AND GAS JOURNAL

REVIEW-FORECAST

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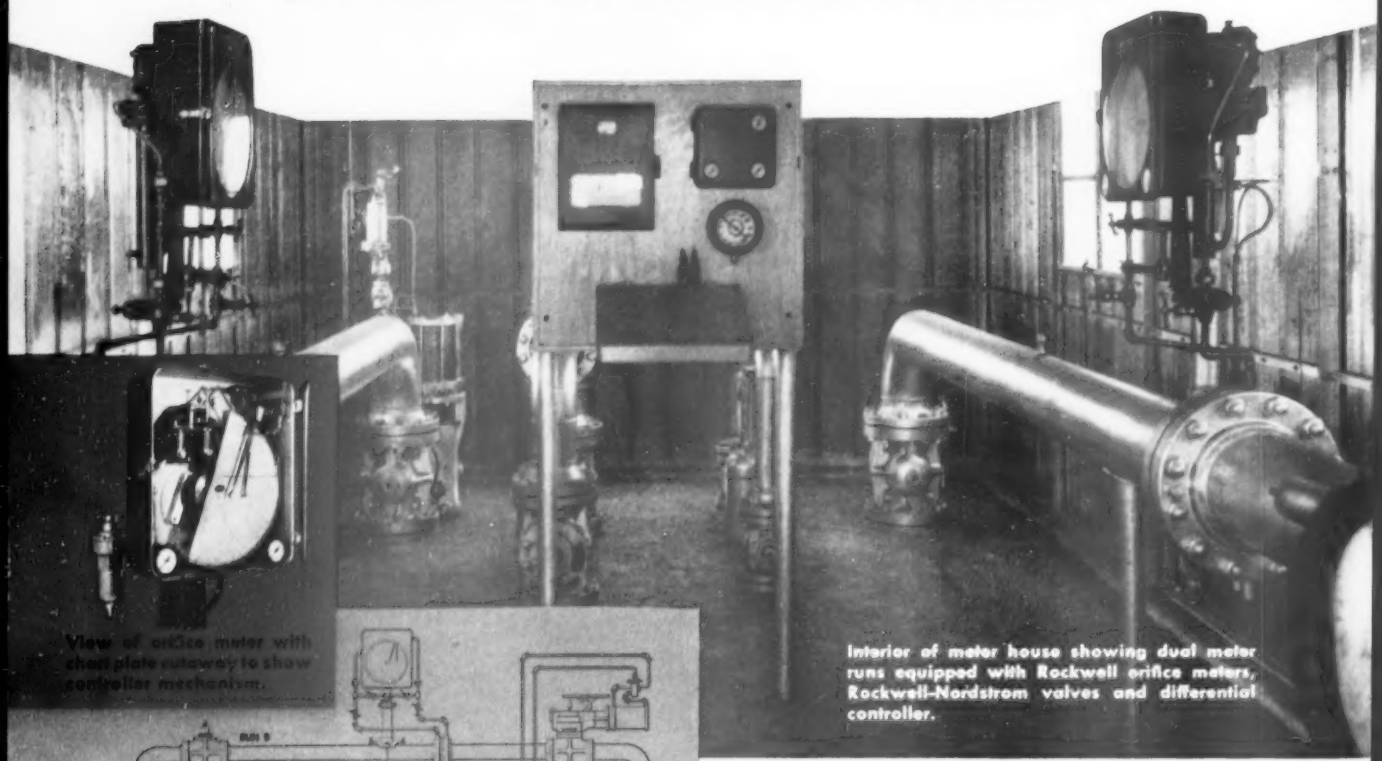
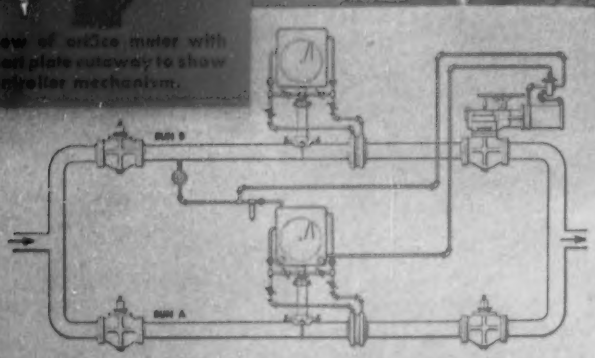
PRICE 50 CENTS TABLE OF CONTENTS ON PAGE 1 JANUARY 25, 1954

Here's A *NEW* and *BETTER* Way To Measure Widely Varying Flows By Orifice



View of orifice meter with chart plate cutaway to show controller mechanism.

Interior of meter house showing dual meter runs equipped with Rockwell orifice meters, Rockwell-Nordstrom valves and differential controller.



Set It... Forget It!

In the Rockwell system, as shown above, the differential control mechanism is incorporated within the case of the Rockwell meter on Run "A." Its purpose is to open or close the Nordstrom cylinder operated valve downstream from the meter on Run "B." Run "A" is on stream at all times.

For example, the Rockwell Differential Controller may be set so that when the differential on a 100" range meter reaches 80", it automatically causes the cylinder operated valve to open, thereby placing the standard flow meter in operation. The differential on the standard meter and the controller will then equalize at some point below 80". When the differential on the standard meter reaches 10", the controller closes the valve and the standard meter is taken out of service.

This mechanical arrangement is entirely automatic. Controllers are available for all standard pressure and differential ranges of Rockwell orifice meters.

with the ROCKWELL DIFFERENTIAL CONTROLLER

With a simple manifold of two Rockwell orifice meters governed by a Rockwell differential controller and a cylinder operated Nordstrom valve, you can now get perfect accuracy when measuring widely varying flow rates. That's because the installation can be tailored to the need. For example, one of the two meter runs could be 4" pipe—the other 12". The use of a cylinder operated Nordstrom eliminates the need and the space taken by a diaphragm type differential valve and leaves no doubt as to a complete shut-off. In many instances, no new valve will be required—simply add a cylinder operator to an existing Nordstrom. This system requires less space and pipe—is more economical to buy and install, most dependable in operation. Write for complete details.

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the OIL AND GAS JOURNAL

JANUARY 25, 1954 VOL. 52 NO. 38

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In Brief . . .

DRILLING PROGRAMS for 1954 call for a total of 48,410 wells including 11,218 wildcats and 37,192 field wells.

TOTAL COMPLETIONS reached new high in 1953 with 49,279 wells, an increase of 3,458 wells or 7.5 per cent.

WILDCAT COMPLETIONS gained 4.8 per cent in 1953 to set another all-time record with 11,062 wells.

CRUDE PRODUCTION gained 3.2 per cent to 6,460,000 bbl. daily in 1953 and will reach 6,557,000 bbl. daily for 1954.

PROVED RESERVES of total liquid hydrocarbons increased 901,000,000 bbl. in 1953 to a total of 34,636,000,000 bbl.

TOTAL DEMAND passed the 8,000,000-bbl.-daily mark in 1953 and domestic demand will pass that level in 1954.

REFINERY RUNS averaged 7,002,000 bbl. daily in 1953, up 2 per cent. Runs may average 7,134,000 bbl. daily in 1954.

PRODUCTION at natural-gasoline and cycling plants averaged 662,400 bbl. daily in 1953 for a gain of 9.5 per cent.

WORLD PRODUCTION averaged 13,021,800 bbl. daily in 1953. Total reserves are estimated at 139,312,500,000 bbl.

NATURAL-GAS PRODUCTION increased 5.2 per cent to 8,423,247 M.M.c.f. Reserves are estimated at 205,353,000 M.M.c.f.

"high pockets" for an oil well

Rampaging floods don't hamper production on this oil well—it's Sun Oil Company's Well No. 3, with the pumping unit located fifteen feet above the southern Illinois Wabash River bottoms. This unit is powered by a famous Fairbanks-Morse ZC Oil Field Engine . . . an engine that thrives on neglect!

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a highly soluble

BRONZE

GASOLINE DYE

to simplify your operations

The mixing of several gasoline dyes to obtain a desired color has long been an inconvenience to refiners.

If you have had this problem in creating a bronze color, it is now easy to simplify your dye addition operations.

Du Pont Oil Bronze makes this possible. The new Du Pont bronze dye is a free-flowing powder that can be easily handled in dry eductor systems as well as in any other commercial method of gasoline dye addition.

Highly Soluble—Oil Bronze has a total solubility in synthetic gasoline of 4500 grams of dye per 100 U.S. gallons. This is in the normal range of solubility of other gasoline colors, and speed of solution is also fast.

This new bronze dye is ready for shipment in standard 100-pound containers . . . also in 50-pound, 25-pound and smaller size packages.

Samples and full details on Du Pont Oil Bronze are available from any Du Pont Petroleum Chemicals Division representative or district office.

PHYSICAL PROPERTIES OF DU PONT OIL BRONZE DYE:

Physical Appearance	Brownish, red powder
Max. Absorption Wave Length, Millimicrons	465-470
Melting Point, °F.	225
Approx. Bulk Density, Lbs./Gal.	1.3
Water Extractability Loss in Strength	
Distilled Water	Nil
Sea Water	Nil
0.1 N-Caustic	Nil

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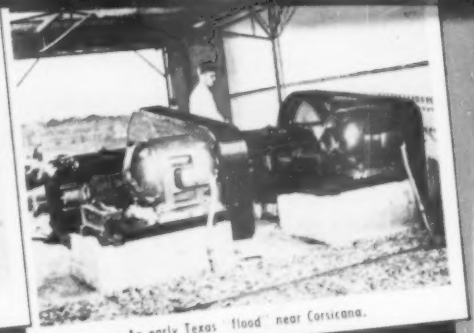
This first "Oilwell" waterflood pump was installed in 1943 and still gives good service.

An early Kansas waterflood near El Dorado.

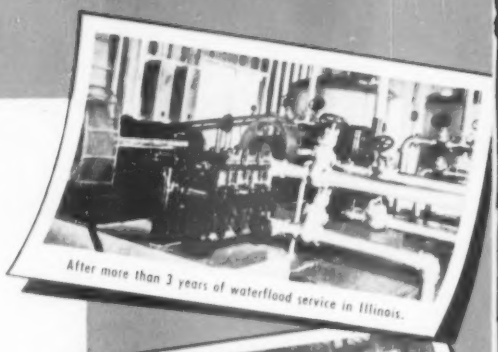


An early Texas "flood" near Corsicana.

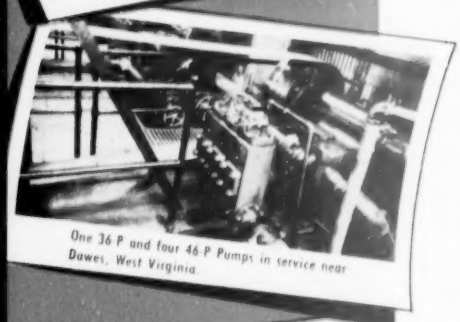
Over 425 "Oilwell" Triplex 6" Pumps

...are now in service on Waterflood Projects EVERYWHERE

20 pumps in one waterflood installation near Bradford.



After more than 3 years of waterflood service in Illinois.



One 36-P and four 46-P Pumps in service near Dawes, West Virginia.

A recent "flood" near Lake Charles, Louisiana.

A recent "flood" by Buffalo Oil Company near Wewoka, Oklahoma.

Two No. 36-P Pumps operate at 1500 p.s.i. at Dominguez field near Long Beach, California.

COLORED portions of this little map show the extent to which waterflood operations have expanded since the Bradford "boom days" of 1935.

To meet the needs of continuous operations at high-pressure, so essential in waterflooding, "Oilwell" introduced the first pumps designed specifically for this type of service.

Today you'll find "Oilwell" No. 36-P and No. 46-P Triplex Plunger Pumps are "*first choice*" of operators in most waterflooding areas because of their outstanding records for continuous, economical performance.

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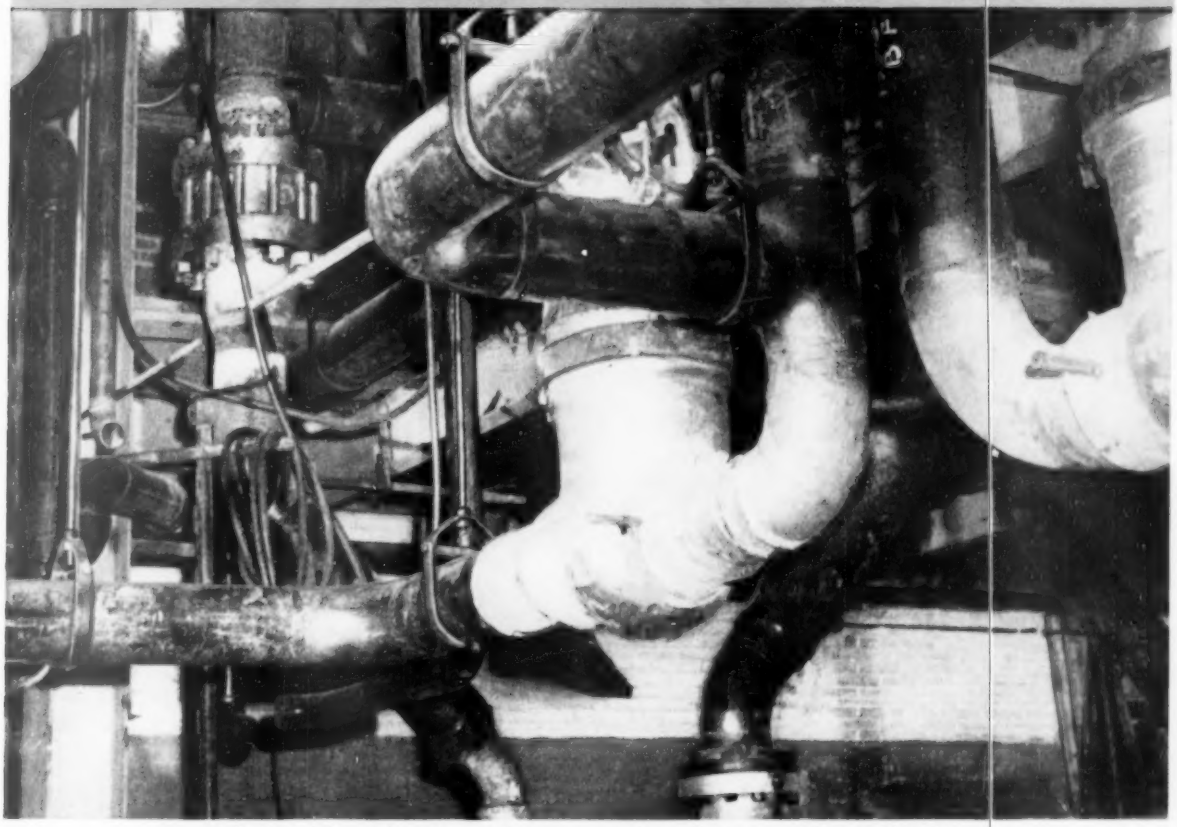


Boiler feed discharge piping shown under construction above will operate at 2700 psi and 430° F.

Grinnell Welding Fittings

exceed bursting strength of seamless pipe

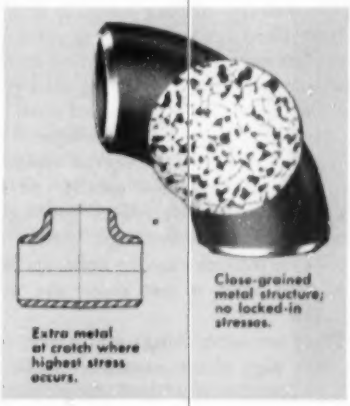
Grinnell Welding Fittings are designed and processed to have a bursting strength greater than the calculated bursting strength of the seamless pipe to which they are to be welded.

Welding elbows and bends are made from seamless steel pipe by a forging process which produces uniform wall thickness at all points; there is no thinning of outer wall.

Welding tees and crosses are made from seamless pipe by a drawing process which provides extra metal and protection at the crotch, where highest stress occurs.

All Grinnell Welding Fittings are process stress-relieved, thus improving grain structure and increasing the strength of the metal.

With all Grinnell Welding Fittings, you get true circularity; smooth, clean inside surface; full, effective radius; easy, sweeping turns; accurate bevels; and true included angles. Available in a wide range of types and sizes, metals and alloys. Send for descriptive catalog.



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Bethlehem M-58

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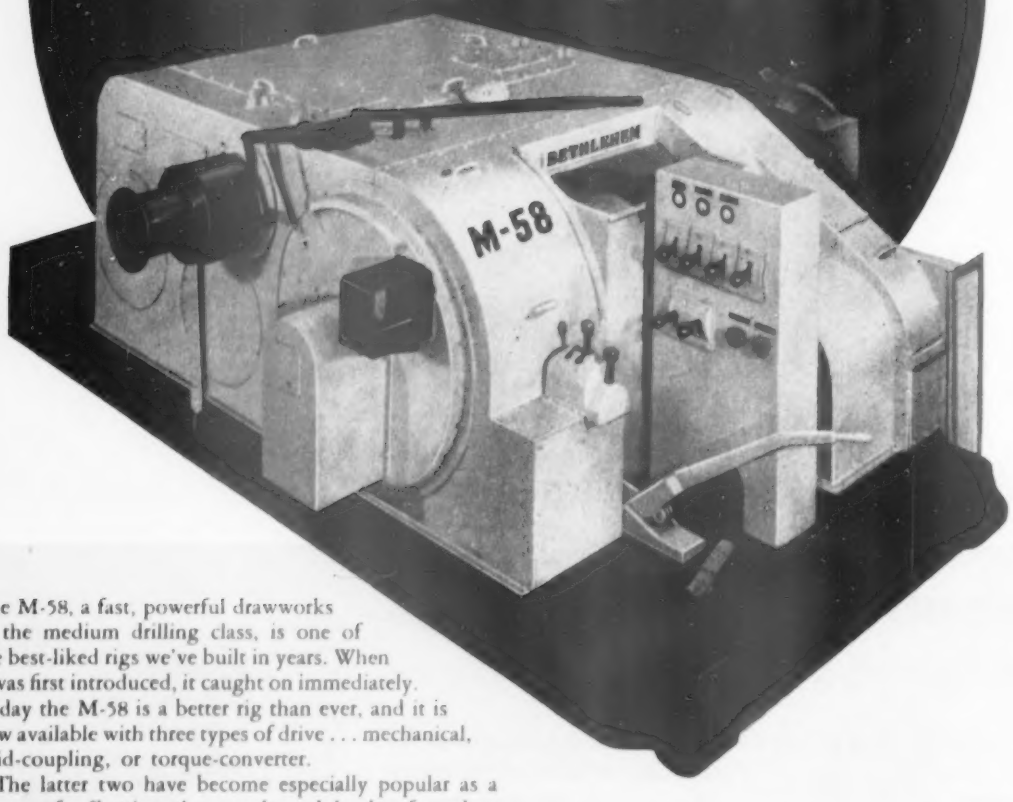

The M-58, a fast, powerful drawworks in the medium drilling class, is one of the best-liked rigs we've built in years. When it was first introduced, it caught on immediately. Today the M-58 is a better rig than ever, and it is now available with three types of drive . . . mechanical, fluid-coupling, or torque-converter.

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The M-58 can be furnished with two- or three-engine drive and single or double pump drive. The engine compound is of sectionalized type so that the rig can be broken down into loads of required road width.

If you haven't yet seen the M-58, we recommend that you do so at your first opportunity. Phone or write us and we'll be glad to show you one of these units in action, where you can study its features.

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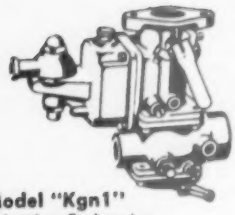
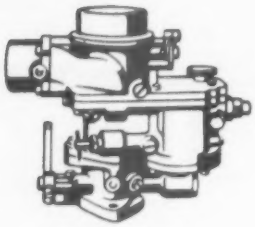
ENSIGN

Model "Kg1"
Gas Carburetor



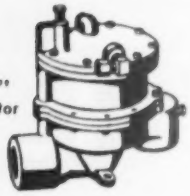
Model "Kgn1"
Combination Carburetor



Model "Cg"
Combination Carburetor

Model "F"
Regulator

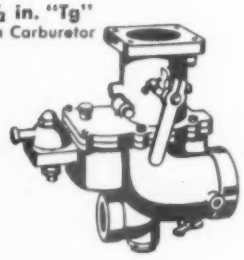
Model 2½ in. "Tg"
Combination Carburetor



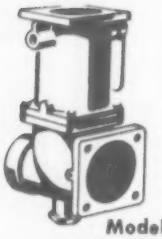
Model "B"
1 in. Regulator

Model "G1"
Gas Carburetor

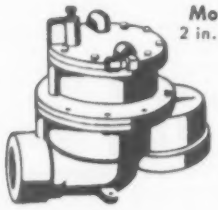
Number 6257
Liquid LP-Gas Filter



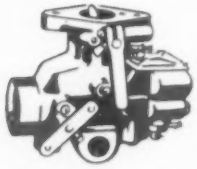
Model "R" 125 H.P.
LPG Vaporizer & Regulator



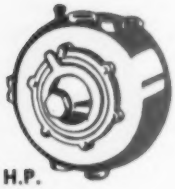
Model "A"
Gas Carburetor



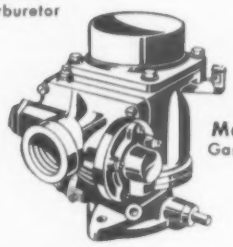
Model "B"
2 in. Regulator



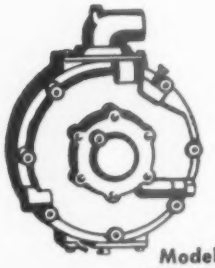
Model ¾ in. "Tg"
Combination Carburetor



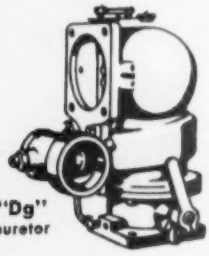
Model "W" 55 H.P.
LPG Vaporizer & Regulator



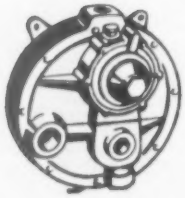
Model "Xg"
Gas Carburetor



Model '
LPG Vapo



Model "Dg"
Gas Carburetor



Model "HD" 450 H.P.
Vaporizer

Complete line of Natural
and Propane Carburetion

5 TO 500 HORSEPOW

ENSIGN
CARBURETOR COMPANY
Huntington Park, Calif. • Chicago 36, Ill.

"on stream" in
massachusetts

This Model IV Fluid Catalytic Cracking unit, with a capacity of 24,000 barrels per day, was the major process installation in an extensive modernization program recently completed by Foster Wheeler at the Everett, Massachusetts refinery of the Esso Standard Oil Company.

FOSTER WHEELER

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Prompt processing and factory delivery on parts not normally stocked in local warehouses.
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Expert supervision of any engine service constantly available by experienced ENTERPRISE Service Engineers.
ADD IT ALL UP and it pays to buy ENTERPRISE—backed by ENTERPRISE Specialized Service.

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Wherever you are, ENTERPRISE service for marine and stationary diesel engines is just as near as your phone.

Usually within a few hours critical parts or service will reach you any place in the world from strategically located ENTERPRISE warehouses.

Whatever your requirements, whether for a simple replacement part or for complete specifications on a new diesel power plant, get in touch with your ENTERPRISE service office. You will find the people there friendly, competent and prompt.

Call the local office near you, telephone the San Francisco factory, or cable ENTERFOUND. Your needs will be immediately routed to the service point nearest you.

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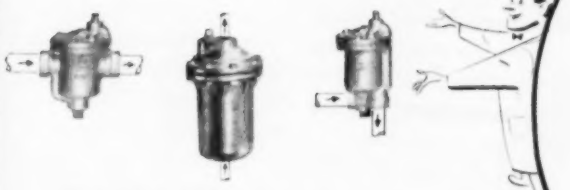
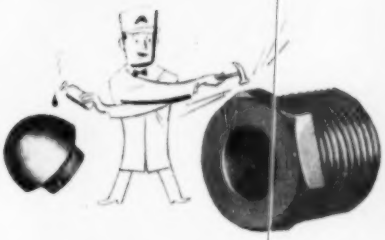
DIESEL ENGINES • OIL BURNERS • PROCESS MACHINERY

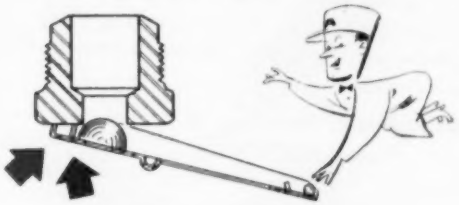
How Armstrong Traps Save you Money



Choice of body styles saves money on installation costs.

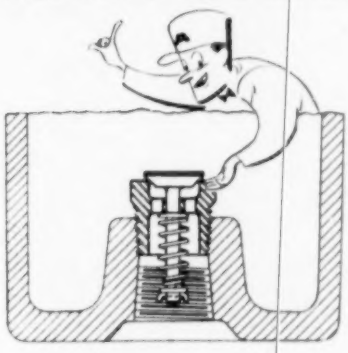


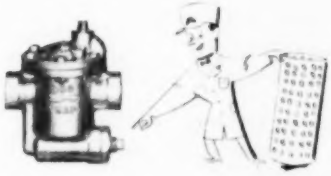
Hardened, ground and lapped valve and seat; stainless steel mechanism resists wear and corrosion—saves money on maintenance.



Two phase leverage means higher capacity in a smaller trap. Armstrong traps have optimum relation between leverage, valve travel, bucket weight, capacity and overall size.

This internal check valve saves labor and fittings required to install regular check valve.





This trap with built-in strainer costs less than separate trap and strainer—requires less labor and fittings to install.

Get the full facts on money-saving Armstrong traps. Send for free Catalog J. Clip and mail coupon today.

ARMSTRONG MACHINE WORKS
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Gentlemen: Please send me a free copy of Catalog J, The Armstrong Steam Trap Book.

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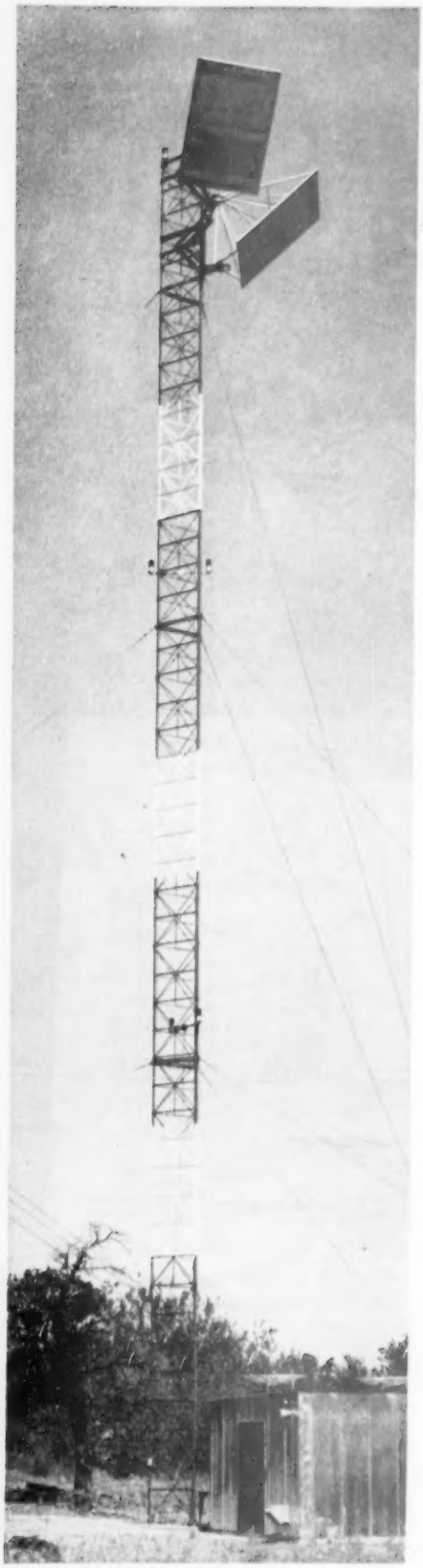
ARMSTRONG STEAM TRAPS



why COLLINS *microwave?*

Because Collins has specialized in the engineering and manufacture of radio-electronic communications equipment for 20 years.

Because Collins aviation, broadcast and VHF radio equipment is endorsed as the finest anywhere by users everywhere.

Because Collins Microwave is the result of years of careful research, development and experiment — years spent in working out technical difficulties — years building maximum reliability and superior performance into the Collins Microwave system.

Microwave provides permanent communications and remote control systems virtually free from interruptions and weather effects. Any organization or industry wants the best Microwave available and the best available is Collins.

SPECIFICATIONS

5929-7500 mc.
FM/AM modulation, with frequency division multiplexing — single sideband, suppressed sub carrier channeling — automatic frequency control — automatic switchover — long life tubes.

COLLINS MICROWAVE CAN SAVE YOU MONEY

LET US ANALYZE YOUR REQUIREMENTS

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Horizontal scratching improves cementing!

HALLIBURTON'S

ROTO WALL CLEANER

Grooving out filter cake with this outstanding tool improves primary cementing. *Its triple-coiled rotating action scratches out the bore hole horizontally.* It minimizes vertical channeling and provides a tight bond between wall and casing.

Halliburton's Roto Wall Cleaner . . . noted for efficient performance under rugged conditions . . . offers a number of important advantages:

It provides open passage for fluid flow while running casing, circulating, or cementing. Reduces lost circulation problems, and minimizes the hazard of sticking casing on bottom. Does not bridge off the annulus, and horizontal scratching action of the spring steel spikes aids in uniform distribution of cement. And, it is economical. Only one size cleaner base is required to fit all O.D. casing sizes.

These are just some of the reasons Roto Wall Cleaner is the accepted leader in its field. Use it always to obtain improved primary cementing. Phone your local or district Halliburton office. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

CEMENTING SERVICES

THERE'S NO SUBSTITUTE FOR EXPERIENCE IN OIL WELL CEMENTING

Low Pressure Gas On An Isolated Lease? Produce It Profitably With A . . .

Fig. 1 — Possible Gasoline & LPG Recovery

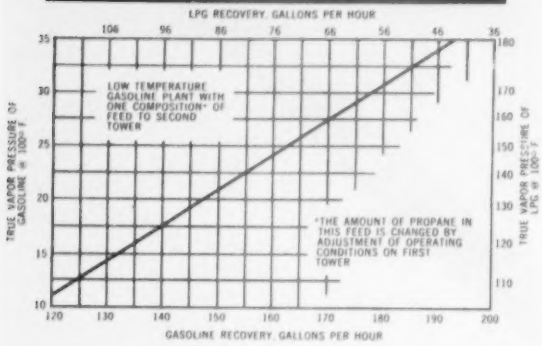

LPG RECOVERY, GALLONS PER HOUR
106 96 86 76 66 56 46 36
LOW TEMPERATURE GASOLINE PLANT WITH ONE COMPOSITION* OF FEED TO SECOND TOWER
*THE AMOUNT OF PROPANE IN THIS FEED IS CHANGED BY ADJUSTMENT OF OPERATING CONDITIONS ON FIRST TOWER
TRUE VAPOR PRESSURE OF GASOLINE @ 100° F
TRUE VAPOR PRESSURE OF LPG @ 100° F
GASOLINE RECOVERY, GALLONS PER HOUR
120 130 140 150 160 170 180 190 200

Fig. 2 — Partial Material Balance — Low Temperature Gasoline Plant

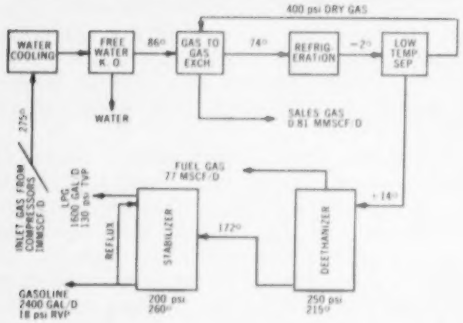
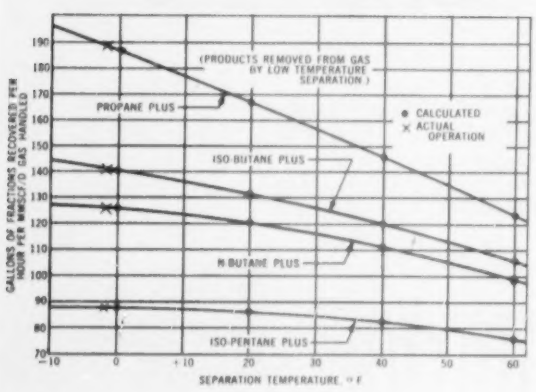


Fig. 3 — Low Temperature Recovery


(PRODUCTS REMOVED FROM GAS BY LOW TEMPERATURE SEPARATION)
PROPANE PLUS
ISO-BUTANE PLUS
N-BUTANE PLUS
ISO-PENTANE PLUS
CALCULATED
ACTUAL OPERATION
GALLONS OF FRACTIONS RECOVERED PER HOUR PER MMSCF/D GAS HANDLED
SEPARATION TEMPERATURE, °F
−10 0 +10 20 30 40 50 60

Some Points of Interest About BS&B Lease-Located "COLD-FRAC"* System Gasoline Plants And Their Operation:

Figure 1 shows the recovery of various vapor pressure gasoline and LPG products possible for a 1.43 MMSCFD inlet gas rate, such as in the "COLD-FRAC"* System shown on the opposite page. A high vapor pressure LPG which contains a high percentage of propane and the maximum vapor pressure gasoline which can be sold usually results in the greatest production. However, market demand often limits the specification of one or both of the products so that the greatest income can be realized by producing a lower vapor pressure gasoline and LPG products. In the case of this plant, propane becomes surplus when producing low vapor pressure LPG and the maximum production of salable products is obtained by properly distributing the butanes between the LPG and the gasoline.

Figure 2 is a partial plant material balance when producing an 18 psi. Reed Vapor Pressure gasoline and a 130 psi. True Vapor Pressure LPG.

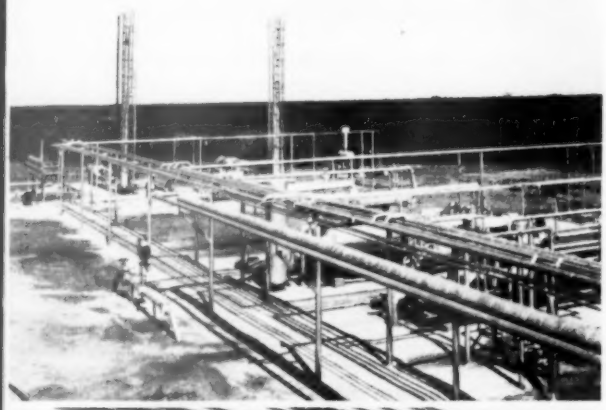
Figure 3 is a plot of the calculated recovery versus separator temperature as compared to that actually obtained at —2° F. It clearly illustrates the effect of temperature upon the recovery of various components. Because of these characteristics, it has been found that the optimum separation temperature is a function of the gas anaylsis and the products desired. When processing gas containing a very large excess of propane and/or when recovery of a stable gasoline only is desired, separation temperatures above 0° F. are usually indicated.

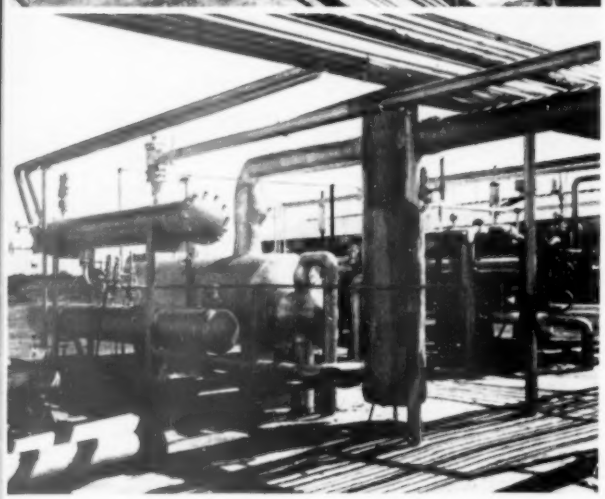
The Efficiency of the Cold-Feed, Non-Refluxed De-Ethanizer is of special interest. Operating experience has been very satisfactory. On this plant, for example, it was found that 96.6% of the propane plus fractions and 92% of the propane, 98.4% of the iso-butane plus fractions were recovered by the non-refluxed tower on a volume percent basis, based on the liquid feed to that tower. At the same time, less than 2 mole % of ethane was allowed to remain in the bottom product of the tower when operating conditions were set for maximum propane recovery, and when the feed contained approximately 24 mole % ethane and lighter fractions.

Your BS&B Man **will be glad to give you more detailed information on BS&B Lease-Located "COLD-FRAC"* System Gasoline Plants or on any of the many other kinds of BS&B oilfield equipment. Or you may write directly to . . .**

. . LEASE-LOCATED BS&B COLD-FRAC* SYSTEM GASOLINE PLANT

See From This Actual Case History What COLD-FRAC* Is Doing For One Operator!





PROBLEM: This operator† of an isolated lease in northern Texas had found it necessary to install a gas lift and gas injection system. With an available production of 1.43 MMSCFD of low pressure separator gas for processing, a gasoline plant was needed to make the entire operation economically attractive. But a conventional "permanent" type of gasoline plant was *not* economically feasible. Here was a kind of situation that BS&B Lease-Located "COLD-FRAC"* System Gasoline Plants were developed to meet!

SOLUTION: BS&B engineers were called in to design, engineer and fabricate this Lease-Located "COLD-FRAC"* System Gasoline Plant With Mechanical Refrigeration for the production of natural gasoline and LPG from low pressure gas. Its design capacity:

Flow Rate—2MM Cubic Feet of Gas Per Day
Pressure—400 p.s.i.g. (500 p.s.i.g. operating pressure)
Temperature—100° F. (leaving compressor aftercooler)

RESULT: In a recent operating test this newly constructed "COLD-FRAC"* System was performing as follows:

Flow Rate (Plant Inlet)—1.43MM Cubic Feet of Gas Per Day
Sales Pressure—400 p.s.i.g.
Temperature—86° F. (leaving aftercooler)
Dehydration of Sales Gas — To dew point of — 10° F.
Gasoline Recovery — 2,880 Gallons of 26 psi. Reed Vapor Pressure Natural Gasoline Per 1MM Cubic Feet of Wellstream Gas
(During this test, no attempt was made to control the LPG mixture — therefore, no LPG recovery is shown.)

This operator is now producing and processing his gas at maximum profit . . . is delivering pipeline specification gas to the sales line . . . and is meeting all state conservation requirements—all at a minimum capital investment with a BS&B "COLD FRAC"* System!

* "COLD-FRAC" is a trade-mark of Black, Sivalls & Bryson, Inc.
(Patented and patents applied for.)

† Name supplied on request.

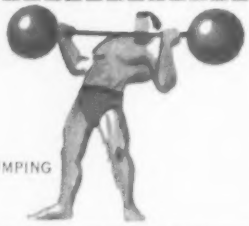
EFFICIENCY OVER 60 YEARS BS&B RELIABILITY

BLACK, SIVALLS & BRYSON, INC.

Oil & Gas Equipment Division, Dept. 1-A1A

1708 West Main Street — Oklahoma City, Oklahoma

WHAT IS YOUR WELL CONDITION?



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AXELSON MANUFACTURING COMPANY DIVISION

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Check the information below and realize that Axelson provides the right combination of **matched** seat-and-ball for every pumping condition.

As with all Axelson products, this vital pump part is the finest obtainable. Axelson seat-and-ball quality is your best insurance against costly production failures. Each micro-finished ball has mechanically perfect mating with each of the two precision ground surfaces of the seat. Hence, seat-and-ball becomes a matched pair, vacuum tested as a pair and packaged as a pair.

AXLOY Very hard stainless steel, hardened and tempered in controlled electric furnaces. Recommended for almost every well condition except where well depth, fluid gravity, strokes per minute, etc., create heavy seat-and-ball impact, or where there are extreme "outlaw" conditions of corrosion and abrasion.

XL Combines the very hard stainless AXLOY ball with a moderately hard stainless steel seat. Recommended for heavy pumping wells where a harder seat may chip due to ball impact. Priced lower than AXLOY.

AXREX Hard cobalt-chromium-tungsten alloy, centrifugally cast. It gives a superior service in corrosive pumping wells.

TUNGSTEN CARBIDE Super hard cemented carbide alloy. Made by powder metallurgy under extreme pressure at extreme temperatures. Recommended for any conditions of corrosion and abrasion.

ACME A low cost combination offering excellent wear resistance where corrosion and abrasion are not serious. Recommended for easy pumping conditions.

PLANTS: Los Angeles 58, California; St. Louis 16, Missouri. **OFFICES:** New York 7, New York; Tulsa 1, Oklahoma; Buenos Aires, Argentina. **DISTRIBUTORS:** Jones & Laughlin Steel Corp., Supply Division; Great Northern Tool & Supply Co.; Industrial Agencies Ltd., San Fernando, Trinidad, B.W.I.; Industrias Waldrip & Campbell, Barcelona, Caracas and Maracaibo, Venezuela; Sociedad Commercial de Materias Primas Limitado, Rio de Janeiro, Brazil; Adrian Bolland & Co., Avda. Pte R. Saenz Pena 832, Buenos Aires, Argentina; Wells Fargo & Co., Express, S.A., Apartado Postal 361, Mexico, D.F.; Dominion Oilfields Supply Co., Ltd., Calgary, Canada.

Pump supplies pressures up to 1000 pounds; TIMKEN® bearings keep pinion and crankshaft in line

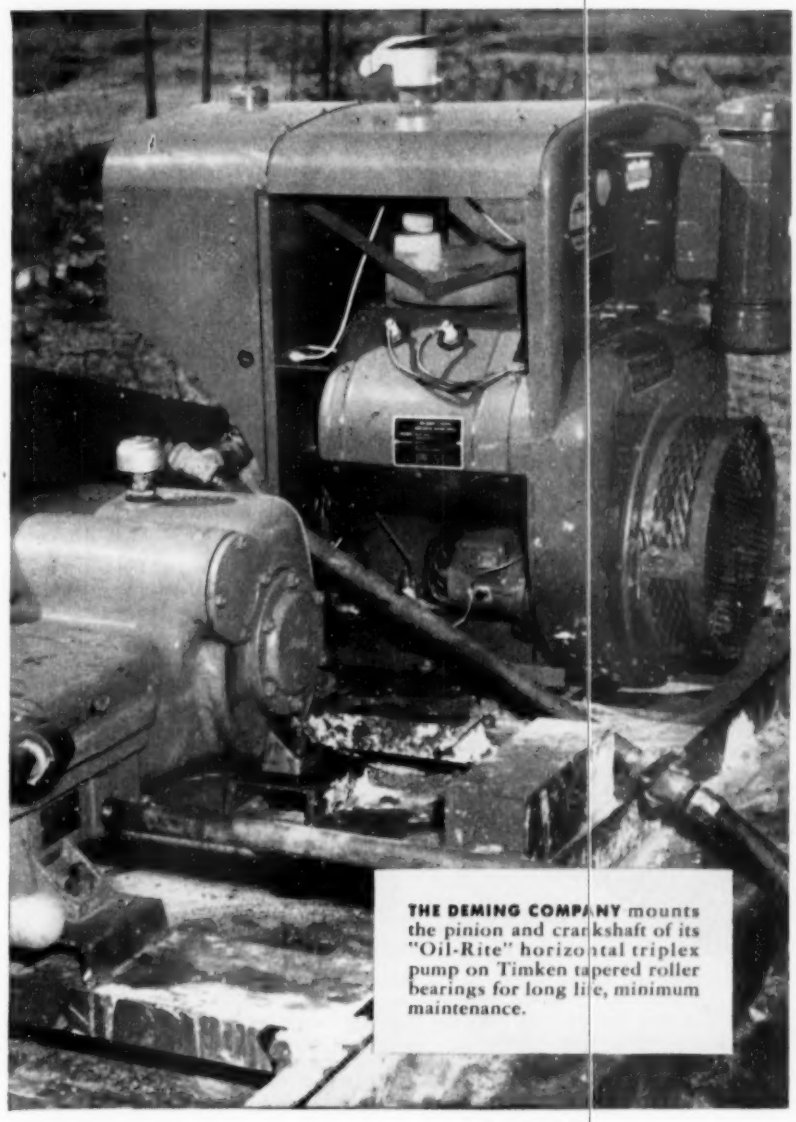
THE "Oil-Rite" horizontal triplex pump pictured here in use in the Oklahoma oil fields is designed for high pressure work where a dependable, automatically oiled pump is required. To make sure it delivers smooth, trouble-free performance with minimum time-out for maintenance, The Deming Company mounts the pinion and crankshaft on Timken® tapered roller bearings.

Timken bearings on the crankshaft take both radial and thrust loads, hold the shaft in proper alignment, minimize deflection and end-play. There's less wear on related parts—less time lost in repairs. Timken bearings on the pinion shaft carry the heavy gear loads—insure accurate, smooth gear mesh. Result: longer gear life, smoother flow of power.

Timken bearings hold housings and shafts concentric, making closures more effective. Lubricant is kept in—dirt and moisture kept out. And due to their true rolling motion and smooth surface finish, Timken bearings practically eliminate friction, reduce wear.

Be sure to specify Timken bearings in the machines you build or buy. They give longer life with minimum maintenance. Look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, O. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



THE DEMING COMPANY mounts the pinion and crankshaft of its "Oil-Rite" horizontal triplex pump on Timken tapered roller bearings for long life, minimum maintenance.

DESIGN LEADERSHIP

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roller ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ⊕ AND THRUST ⊕ ← LOADS OR ANY COMBINATION ⊕

Both engine and generator are mounted on a sturdy frame. Two-wheel mounting also available.

New P&H WN-250 Pipeliner

—an engine-driven arc welder developed by pipeliners to meet pipeline-welding requirements

Here you get everything you've ever wanted in a pipeline welder — including features you don't get from any other. Take a look:

(1) The P&H WN-250 is NEMA-rated at 200 amps—*but pulls 300 amps!*

(2) It has a full 20-gallon gas tank — runs all day on one tankful!

(3) It is powered by a four-cylinder, 180 GLU, Waukesha gasoline engine —direct-connected, water-cooled, and built for heavy duty. And we really mean *heavy* duty — it's not an automotive light-weight.

(4) P&H idling device establishes the rated speed of 1800 rpm as soon as the arc is struck. This speed is maintained for a set period after the arc is broken.

(5) P&H Dial-lectric Control provides stepless heat adjustment over the entire 3 ranges — with just a turn of a radio-type knob.

(6) Pre-lubricated bearings reduce the need for servicing and insure longer life.

(7) Auxiliary AC power-supply (1 KVA) permits flood-lighting and running power-tools.

There are other reasons why you're money ahead with a P&H WN-250. Ask your P&H representative or distributor for all the facts. Or, write for bulletin.

P&H WELDING DIVISION
HARNISCHFEGER CORPORATION
4527 W. National Ave., Milwaukee 46, Wis.

Continuous 8-hour welding test demonstrates the extra stamina of the P&H WN-250

You can't beat welding performance like this: In a recent test, the P&H WN-250 operated continuously for 8 hours on a 70% duty cycle.

A 5/32" electrode was used with 300 feet of cable. There were 250 amps. at the electrode. So that the test would be continuous, three welding operators were used. When one got tired, another took over. All used the drag technique with a 6010 rod — which is as close to a short circuit as you can get.

At the end of 8 hours, the P&H generator was still cool. And the WN-250 was still rarin' to go—the weldors were worn out, but not the machine.

the P&H *line*

2595A

P&H Welding equipment is manufactured and sold in Canada by
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This is the Golden Year

First the boy; then the man.

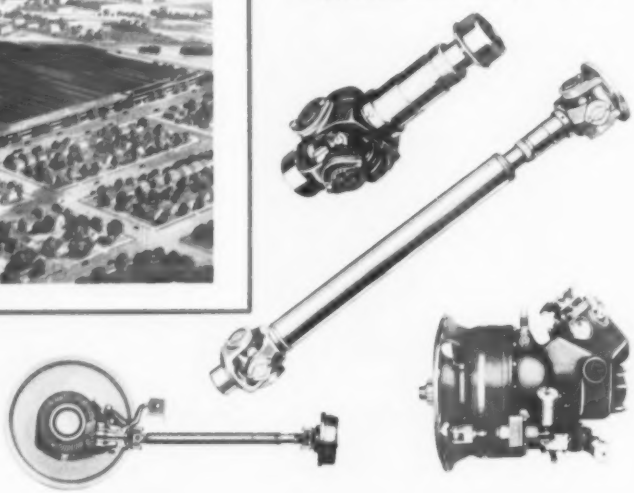
In 1904, Spicer was a new company, standing with hundreds of other companies on the threshold of America's brilliant automotive era.

In 1954, Spicer is an international economic force that has grown through 50 years of uninterrupted service to the great automotive industry.

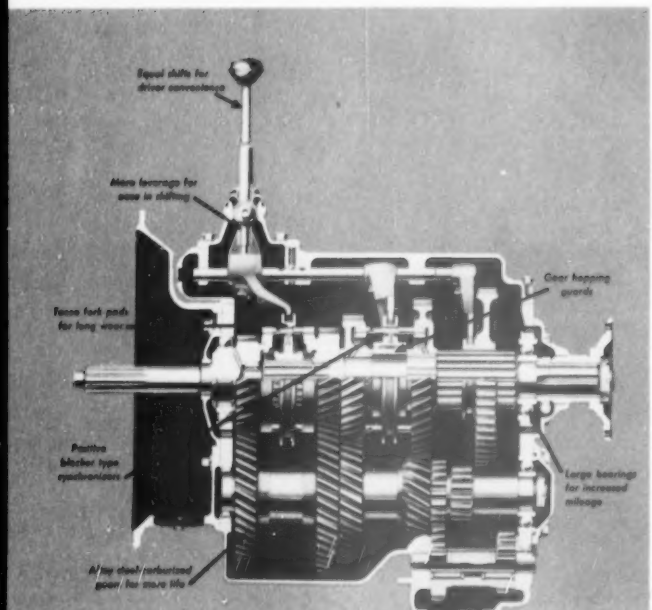
This is the Golden Year for Spicer. This is the year for projecting new plans; the year for looking forward to new horizons; the year to start building for another 50 years of golden opportunities to grow and to serve.

THIS IS SPICER IN TOLEDO, OHIO

Major products of the Toledo plant are the large sizes of the famous Spicer Universal Joints and Propeller Shafts, Transmissions, Railway Generator Drives, Torque Converters, and related materials



The Spicer Brown-Lipe Synchronized Transmission puts more productive horsepower *into driving wheels*



Moving more tons at less cost per mile, with increased driver comfort and efficiency, are important functions being rendered daily in thousands of Spicer Fully Synchronized Transmission applications. Its advantages include:

Fully Synchronized in All Speeds above 1st	
Faster Shifts	No Missed Shifts
No Double Clutching	Less Driver Fatigue

This assures:

Faster Trips	Fuel Savings
Lower Upkeep	Increased Safety

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50 YEARS OF Spicer SERVICE

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Customers are the one thing we can't do without.

The only unusual thing about this is the fact that we know it.

There is no glassy look in the eyes of our credit men. Management is rightfully humble. J&L salesmen are universally helpful. J&L manufacturers eagerly support this attitude—you get better equipment, more accurately tailored to your changing needs and the progress of the industry.

J&L service is everywhere from the Rockies east. You can get a part in Canada for equipment you bought in West Texas.

We'd like you for a customer—and J&L customers enjoy many advantages. In your telephone directory you'll find from one to a dozen or more J&L numbers. Call one now.

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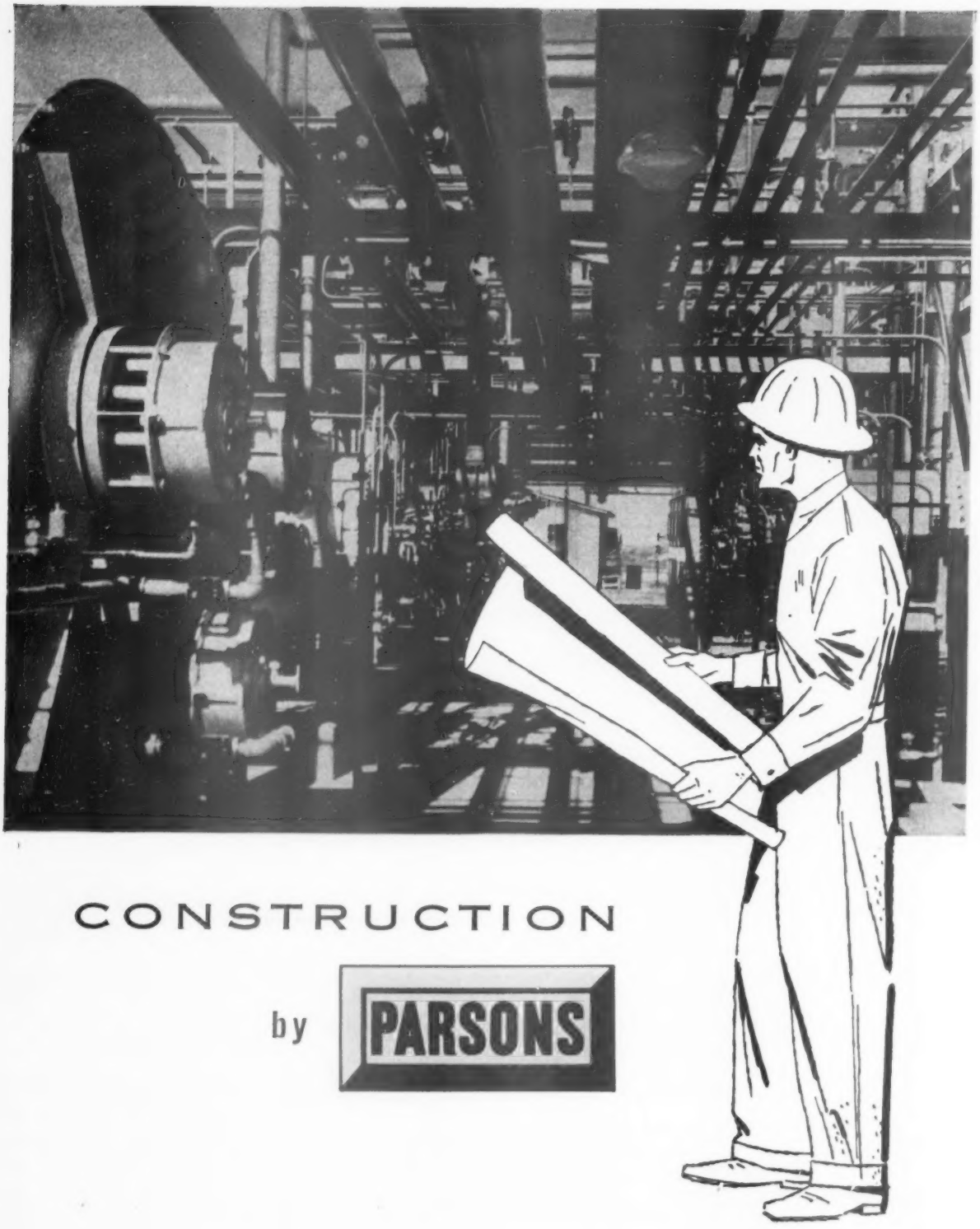

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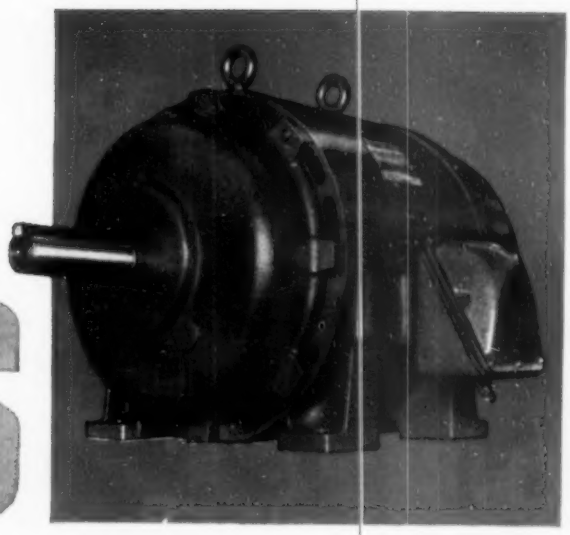
"ALL MOTORS ARE NOT ALIKE!"



FOR RUGGED SERVICE, Reliance Motors are built better to last longer. These *Precision-Built* Motors combine maximum strength with shock-resistant frame and bearing-bracket construction. Write for Bulletin B-2101.

RELIANCE
Precision-Built
MOTORS

B-1470

RELIANCE ELECTRIC AND ENGINEERING CO.

1120 Ivanhoe Road, Cleveland 10, Ohio • *Sales Representatives in Principal Cities*

FASTER

MORE EFFECTIVE... MORE DEPENDABLE

FIRE-STOPPING POWER

MODEL 20-B

ANSUL
Chemical Company
FIRE EQUIPMENT DIVISION • MARINETTE, WISCONSIN

ANSUL

FIRE EXTINGUISHING EQUIPMENT

FASTER . . . A short, quick downward motion of the puncture lever pressurizes the extinguisher and it is ready for instant use.

MORE EFFECTIVE . . . Even the inexperienced operator gets near-expert results because of the ease of operation and handling. In addition ANSUL *"PLUS-FIFTY"* Dry Chemical has greater fire-killing power.

MORE DEPENDABLE . . . Exclusive ANSUL-ENGINEERED design features include water-tight and corrosion-resistant construction, easy, on-the-spot recharge without special tools and other exclusive Ansul developments which insure greater dependability.

FIRE-STOPPING POWER . . . ANSUL FIRE EXTINGUISHERS have the highest ratings for fire-stopping power ever awarded any type of class B and C fire extinguishing equipment.

Send for File No. B-210. You will receive a variety of helpful printed matter. Included is our latest catalog which describes Ansul Extinguishers of all sizes — from the small Ansul Model 4 to Ansul Piped Systems and Ansul 2000 lb. Stationary Units.

OFFICES AND DISTRIBUTORS IN PRINCIPAL CITIES IN THE U. S. A., CANADA AND OTHER COUNTRIES

ANSUL

PROVIDES THE MOST COMPLETE LINE OF DRY CHEMICAL FIRE EXTINGUISHING EQUIPMENT

HAND PORTABLES

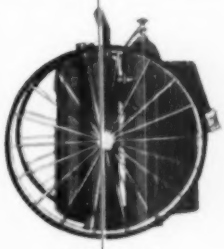
MODEL 4-C

MODEL 20-B

MODEL 30-B

NEW WHEELED PORTABLES

MODEL 150-B

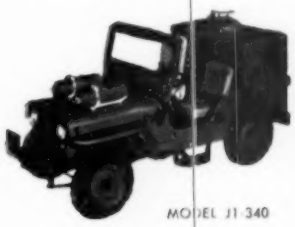


MODEL 350-B

In Ansul's complete line of Fire Extinguishing Equipment there is a model of just the right size to adequately protect nearly every type and area of class B and C fire hazards in, or around, your plant. And, more important, even the largest capacity wheeled portable and stationary equipment by Ansul, is designed for quick, easy, one-man operation.

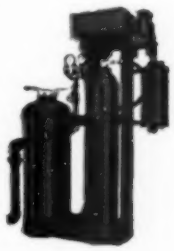
Ansul Fire Extinguishers are designed for maximum effectiveness even when used by inexperienced employees. They are easy to operate and can be quickly recharged "on-the-spot." No special tools are required for recharging, inspection or maintenance. In addition, all Ansul Equipment is water-tight and corrosion-resistant for longer, trouble-free service.

TRUCK MOUNTS, TRAILERS AND FIRE TRUCKS



MODEL J1-340

MODEL S-2000-B



PIPED SYSTEM

STATIONARY EXTINGUISHERS AND PIPED SYSTEMS

ANSUL
Chemical Company
FIRE EQUIPMENT DIVISION • MARINETTE, WISCONSIN

MANUFACTURERS OF DRY CHEMICAL FIRE EXTINGUISHING EQUIPMENT, REFRIGERATION PRODUCTS, INDUSTRIAL AND FINE CHEMICALS AND LIQUEFIED GASES

The First Butane-Propane Hose Listed by Underwriters' Laboratories

This Important Label Tells the Story!

UND. LAB. INC. INSP.
LP GAS HOSE NO. 101
MAX. WK. PRESS. 250PSI

Scientific tests were conducted by Underwriters' Laboratories to determine "the strength and durability of the hose, and resistance of the tube to action of the liquefied propane and butane to which it will be subjected in service." Aeroquip 1533-type Hose met every requirement and was the first L.P.G. Hose authorized to carry the Underwriters' Laboratories label.

AEROQUIP HOSE AND FITTINGS ARE MATCHED FOR GUARANTEED PERFORMANCE

Now you can take advantage of the cost-cutting, time-saving features of Aeroquip Hose for L.P.G. applications. Now you can make hose lines as needed by cutting bulk hose to required length and attaching the reusable fittings. It's quick, easy and it simplifies inventory problems. U.L. listed Aeroquip 1533-type hose is recommended for use on engines and other "fixed" installations. It is exceptionally light, flexible, and strong. A braided wire reinforcing layer within the hose provides hundreds of points of contact with the hose fitting thus assuring safe conductivity of static electricity. Also available is Aeroquip 1536-type hose which is rubber covered to resist the effects of abrasion in bulk handling applications. 1536-type hose is now being tested by U.L.

Aeroquip

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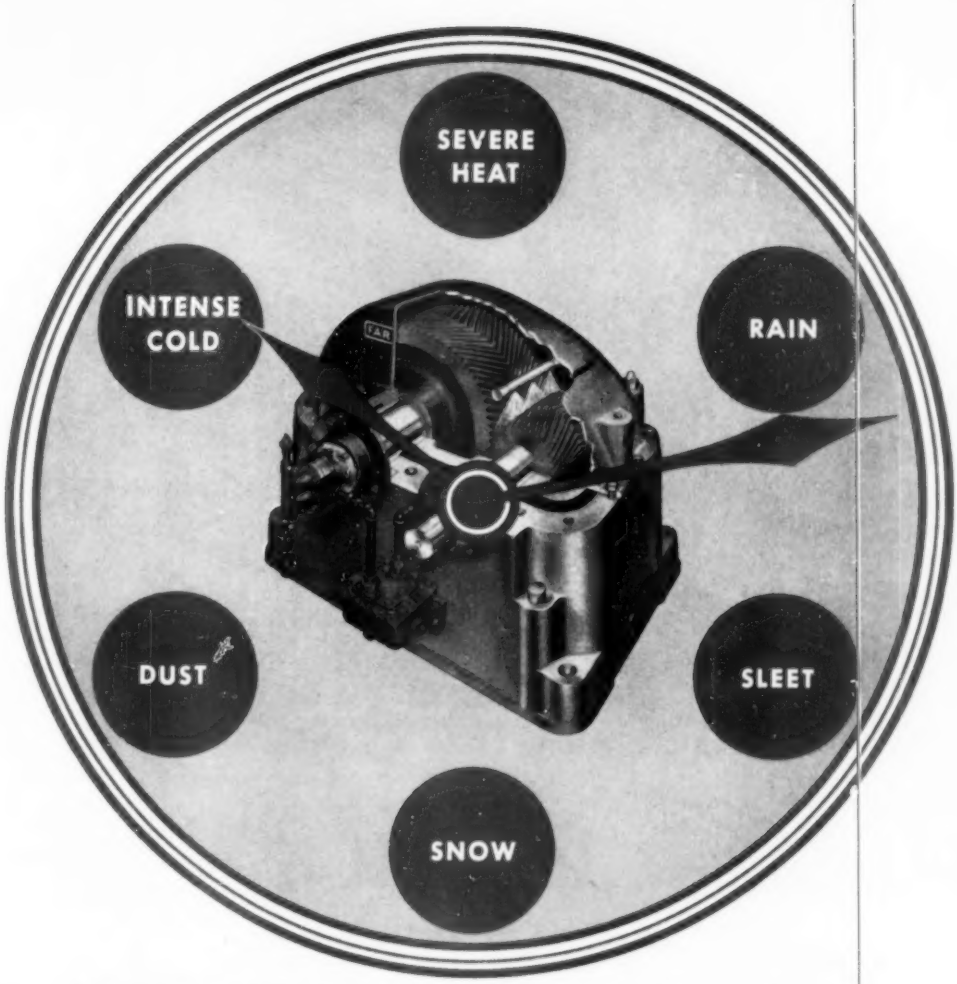
AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD



SPEED INCREASERS for 'round-the-clock service

Farrel® speed increasers are designed for continuous day and night operation under the most adverse conditions encountered in pipeline pumping service.

The "perfection" of the design is a matter of record. Since 1932, when the line was first developed, hundreds and hundreds of these units—totalling more than a quarter of a million horsepower—have been installed. And, every one is still operating successfully.

This amazing record is worth remembering the next time you are in the market for speed increasers. It provides a virtual guarantee of trouble-free operation.

The modern line consists of 49 standard sizes with speed ratios ranging from 1:1 to 12:1. For higher ratios, units using two sets of gears are supplied with ratio range from 12:1 to 40:1. Two-pinion units, designed to transmit power from a single engine to two pumps are also available.

For further details of these proved-on-the-job speed increasers, send for a copy of bulletin 448A. No cost or obligation.

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FB-844

Thermoid Powerflex . . . Recognized Standard of Rotary Hose Quality

Here's Rotary Hose that's unrivalled for strength and flexibility. Thermoid Powerflex combines oil-and-abrasion-resistant synthetic tube with impregnated multi-ply woven fabric and high tensile steel cable reinforcement. Its tough, extra-heavy cover resists weather and abrasion.

Patented full-flow couplings, securely anchored to each individual cable, are guaranteed leak-proof—positively cannot blow off. Powerflex is available in all standard sizes and lengths. It is pre-tested to 5,000 psi . . . exceeds all API requirements.

Get premium quality at regular price. Specify Thermoid Powerflex Rotary Hose—the most widely imitated Rotary Hose in the oil fields!

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SEE OUR CATALOG IN THE COMPOSITE CATALOG

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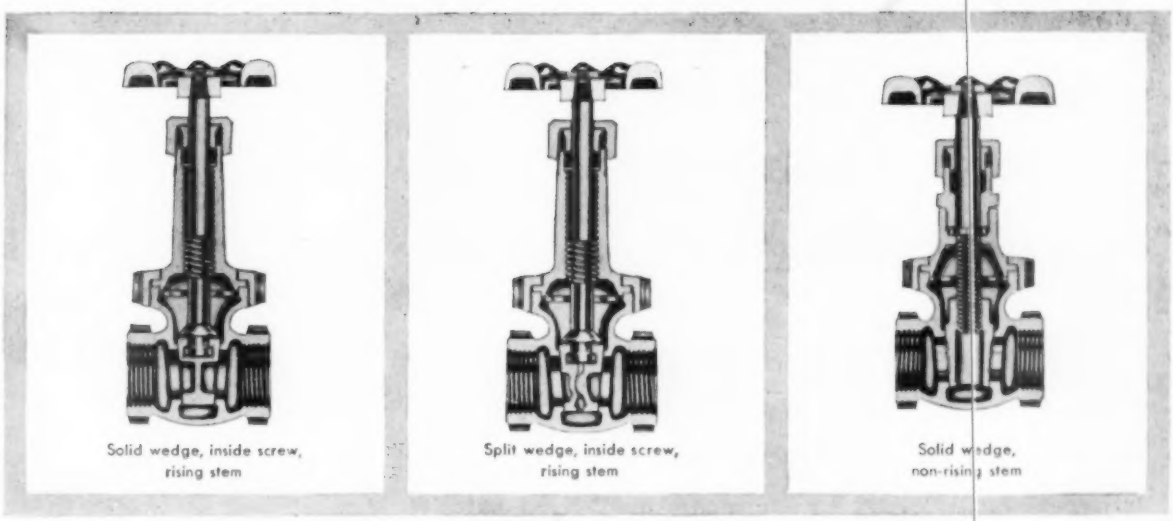
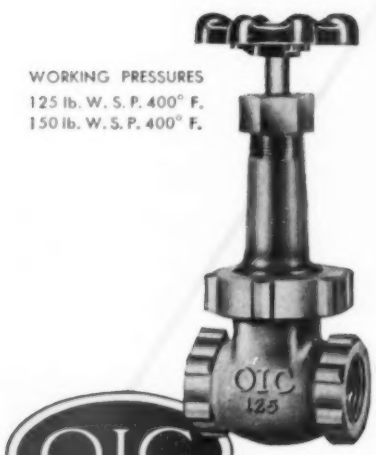
Wire Line Turn Backs • No-Wip Line Savers • Stuffing Box Rings • All Types of Hose • Molded Specialties • Brake Blocks

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

Oh, I see



. . . we've added 125 and 150 lb. bronze gate valves to our union bonnet line



WORKING PRESSURES
125 lb. W. S. P. 400° F.
150 lb. W. S. P. 400° F.

Success of our 200 lb. line of union bonnet bronze gate valves necessitates expansion of the line to include 125 lb. and 150 lb. classes. Sizes range from ¼ to 2 inches.

NOTE THESE ENGINEERING FEATURES:

This line has a flat seat on the bonnet which mates against the body, providing adequate bearing area for sealing.

Tight bonnet joint, but easy access to interior for inspection and service.

Full ports permit unobstructed flow.

Back-seating arrangement permits repacking while under pressure.

Split wedge has ball in socket contact . . . permits wedge to adjust itself to seat.

Slip-on type "T" head stem-to-wedge connection.

Lug-type hexes make valves compact and provide a better wrench-gripping surface.

To learn more about this expanding line of valves, write for our *Union Bonnet Bronze Gate Valve Catalog Folder.*

THE OHIO INJECTOR COMPANY • WADSWORTH, OHIO

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FOUNDED 1883

VALVES | **FORGED & CAST STEEL, LUBRICATED PLUG, BRONZE & IRON**

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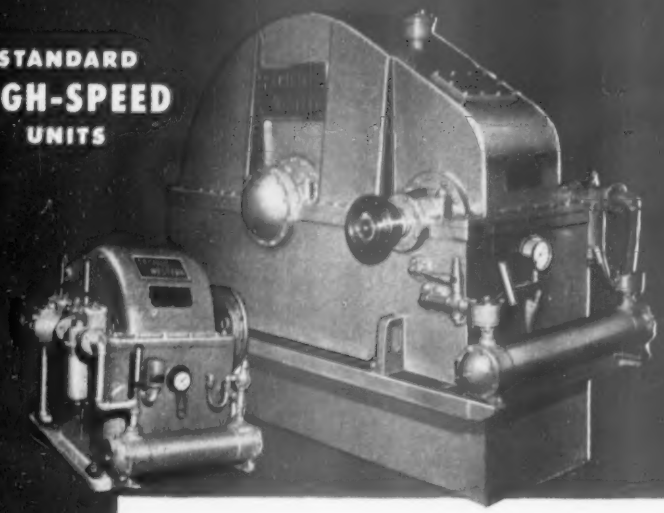
UNITS



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UNITS

GEAR DRIVES

for every type of pumping service

Complete service to the Petroleum Industry by Western Gear Works includes the design, production, testing and application of all types of gear drives.

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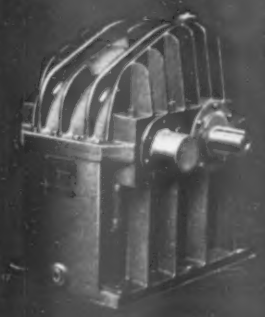
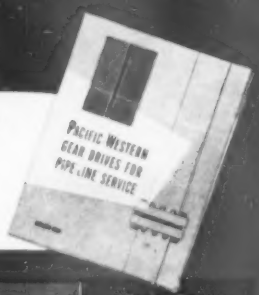
"Good Gears Since 1888"



STANDARD
SPEED-REDUCERS

Write on your letterhead for Bulletin 5204
"Gear Drives for Pipeline Service"



WESTERN GEAR WORKS

Manufacturers of **PACIFIC-WESTERN** Gear Products

Pacific Gear & Tool Works

Plants: Seattle
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The Petroleum Industry

STOPS RUST!

with

RUST-OLEUM

The Practical Way to Save Pipes, Tanks, Derricks, Buildings, Pumps, Roofs, Fences

Ask the maintenance men who battle rust daily! They'll tell you that RUST-OLEUM is the practical answer. (1) It may be applied directly over surfaces *already rusted* without removing all the rust. Wirebrushing and scraping with sharp scrapers to remove rust scale and loose particles is all that is usually required . . . eliminating costly sandblasting and chemical pre-cleaning . . . often enabling one man to do the work of two. (2) RUST-OLEUM *beautifies as it protects in all colors, aluminum, and white.* (3) RUST-OLEUM *stops rust* on every rustable metal surface indoors and out.

See how RUST-OLEUM can cut your maintenance costs. Prompt delivery from Industrial Distributor stocks in principal cities in the United States and Canada.

RUST-OLEUM CORPORATION
2541 Oakton Street • Evanston, Illinois

May be applied directly over rusted surfaces without removing all the rust!

Available in All Colors, Aluminum and White

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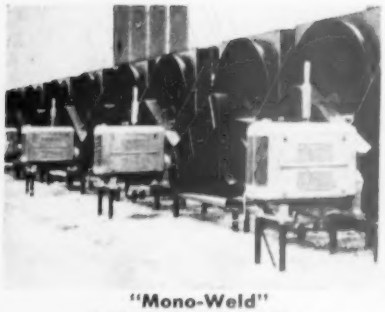
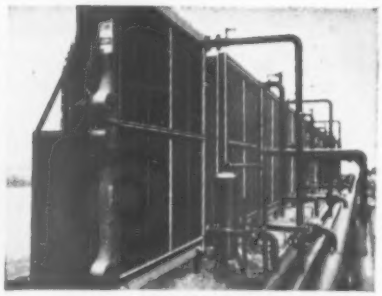
Use Them Individually or in Combination...

YOUNG HEAT TRANSFER PRODUCTS
Are ALL Engineered to Work Together



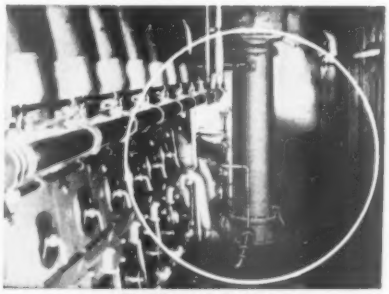
"Mono-Weld" Jacket Water Coolers

Rugged, welded-steel construction assures maximum strength with minimum weight for stationary or semi-portable equipment. Core sections readily replaceable. Tanks easily removed for cleaning.



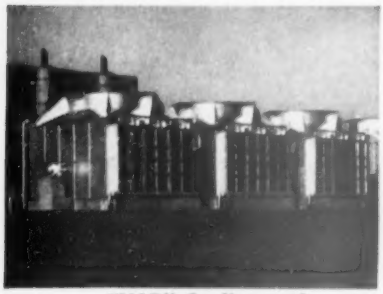
"Full-Flow" Jacket Water Coolers

Sturdy, welded-steel frame with specially-designed Young "Full-Flow" cast tanks. Flexible mountings absorb vibration, allow for expansion and contraction. Tanks easily removed for cleaning.



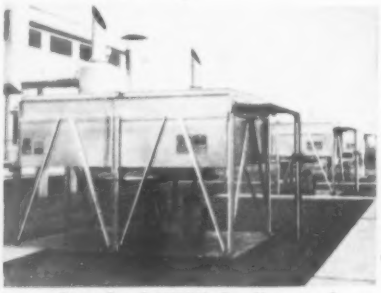
Shell and Tube Heat Exchangers

Available in 690 standard models, single to four-pass, fixed and removable tube bundles. Unusually close-tolerance construction assures maximum cooling with minimum weight. Calculator available.



"VAD" Cooling and Condensing Units

Vertical air discharge permits compact multiple unit installations without loss of efficiency due to cross winds. Low-level mounting, low-cost installation, easy inspection and maintenance are features.



Standard "HC" Cooling and Condensing Units

Horizontal core construction with vertical air discharge. Rugged structural design; wide choice of cores; complete with fans, power plants and controls. In single or multiple type units.

Special "HC" Cooling and Condensing Units

Specially designed, space-saving units, or extra-large capacity cooling and condensing units can be made to exact specifications. Includes standard equipment; accessories, optional.

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Dept. 204-A, Racine, Wisconsin
Plants at Racine, Wisconsin and Mattoon, Illinois

YOUNG

Heat Transfer Products for Automotive, Agricultural, Industrial, Gas and Diesel Engine Applications

Heating, Cooling, Air Conditioning Products for Home and Industry

Leaders In Heat Transfer Engineering for more than 25 years

For a full picture of the complete Young Line of heat transfer equipment, write for a free copy of General Catalog No. 148. For more detailed information on any of the products shown above, please state which products interest you most, and a complete catalog will be sent without obligation.

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HAROLD J. YOUNG, 206 Montgomery Bldg., Muskegon.
JONES & LAUGHLIN STEEL CORP., Supply Div., 106 Main St., Bradford, Penn.; Union Commerce Bldg., Cleveland; 401 Liberty St., Gateway Center, Pittsburgh; Clarksburg, West Virginia.
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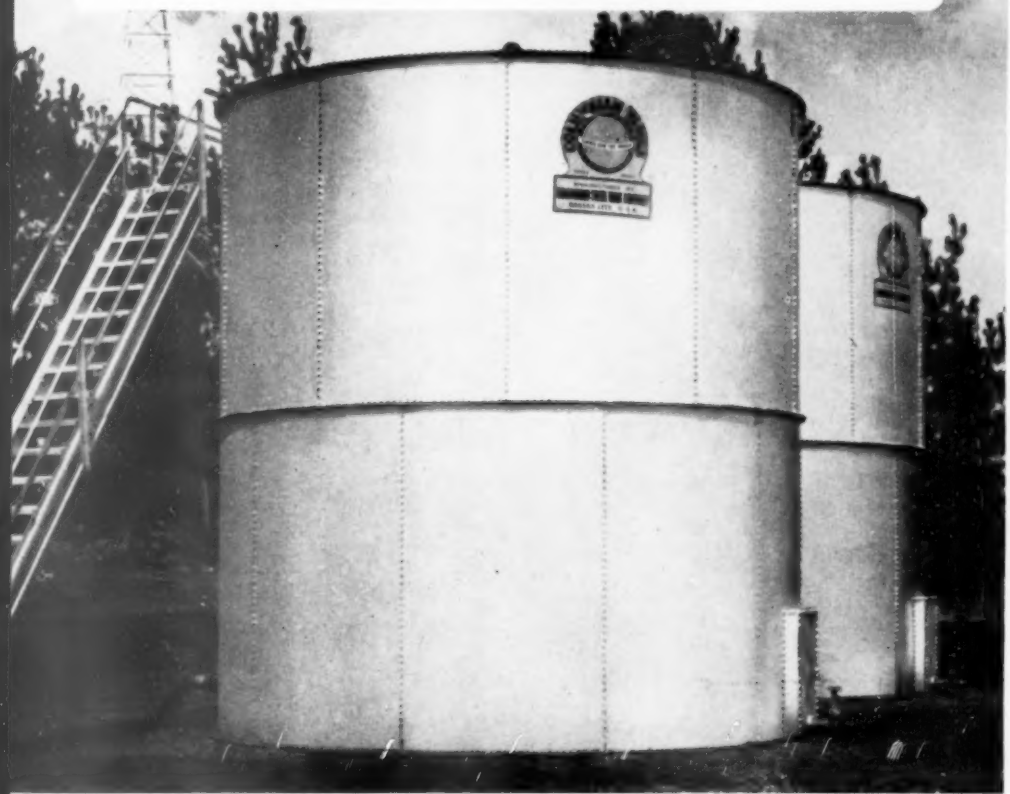
BOLTED STEEL TANKS

The TOP Name in Storage Tanks

The top-ranking reputation of Columbian Bolted Steel Tanks has been won and maintained through unfailing delivery of dependable storage at money-saving cost. On every job to which they have been adapted in the oil fields of the world, Columbian Tanks continue to give extra value in long-life, trouble-free service.

Columbian Bolted Steel Tanks are immediately available for oil producers. Columbian COP-NIC Tanks, especially for sour crude, will be available when conditions permit.



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Mapp Tank Company
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Federal Tank Company, Inc.
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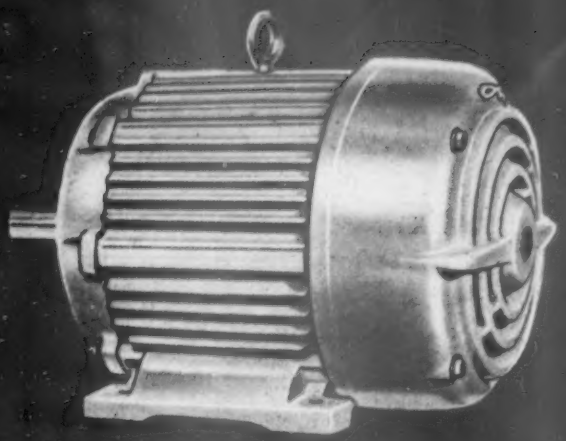
COLUMBIAN ALL-METAL BUILDINGS

These rigid, strong, fire-safe, weather-tight buildings are saving money for more and more users — as warehouses, engine houses, garages, equipment and storage houses. Easy, time-saving erection. Require minimum upkeep. Write for complete information.

COLUMBIAN STEEL TANK CO., P. O. Box 4048-J, Kansas City, Mo.



Here's new power for all standard and special motor applications

The Louis Allis Co. proudly presents the NEW L.A. *Line of electric motors*

Upper: New L.A. Fan-cooled and Explosion-proof Motor

New L.A. Open, Drip-proof Motor

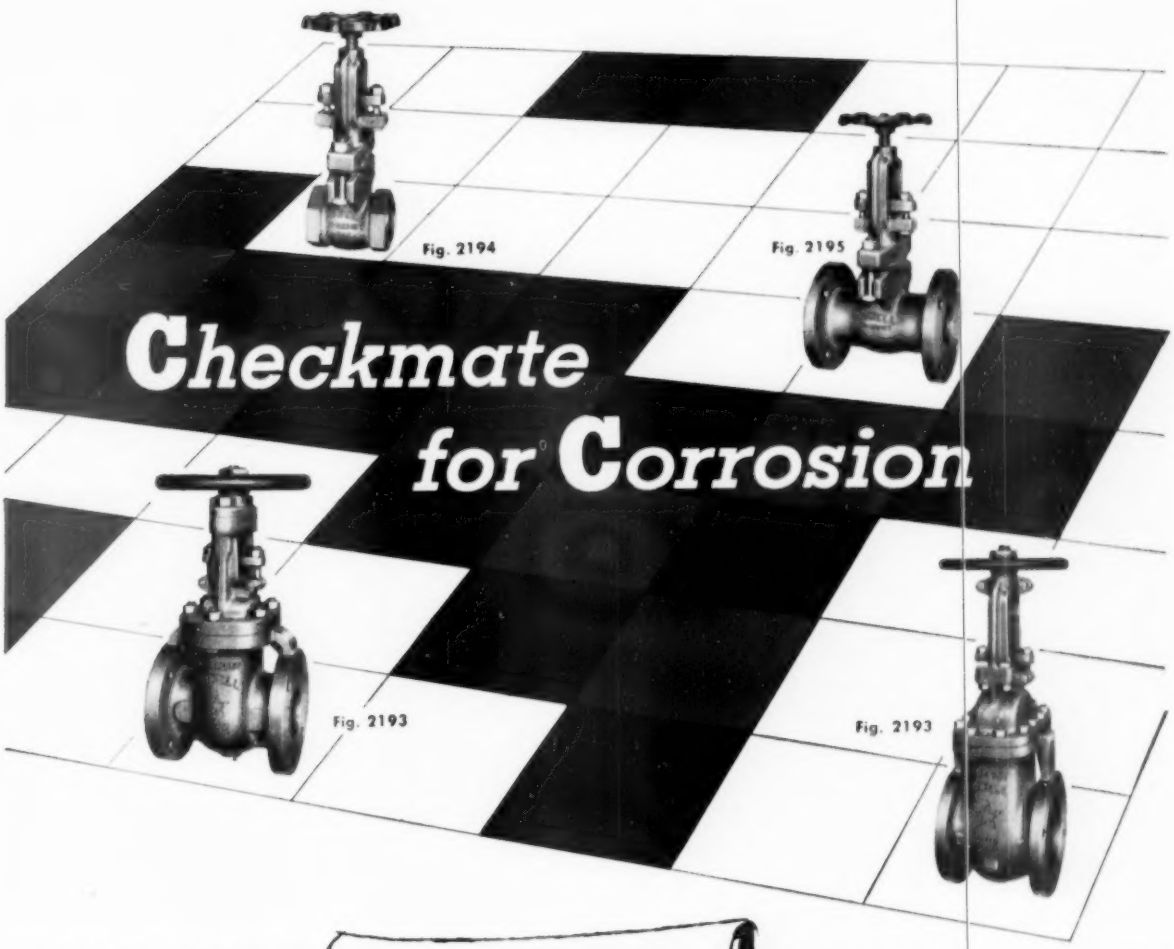
Here is complete utilization of more than 50 years of motor engineering and development—the new L.A. line of electric motors. More than just a "face-lifting" to meet the new NEMA standards, these motors are entirely new through and through—with such features as new modern styling . . . improved ventilation . . . greater motor protection . . . new conduit box arrangement . . . new bearing construction . . . and more versatile mounting.

Improvements in motor design, materials, and manufacturing methods make the new L.A. line possible. These motors pack more power in a smaller, lighter, more functional package. Yet they sacrifice none of the high Louis Allis standards of performance and liberal design.

Get the facts on the most modern motors available—the new L.A. line. Call in your nearby Louis Allis Sales Engineer today for the complete story.

Special Note *Louis Allis motors in old NEMA standard frame sizes will still be available if you require them for interchangeability or replacement.*

THE LOUIS ALLIS CO. • MILWAUKEE 7, WISCONSIN

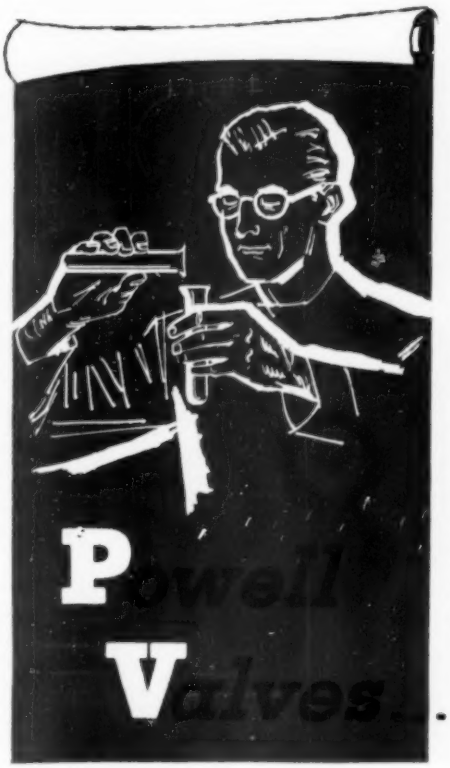


GATE VALVE *(upper left)* **Fig. 2194** for 225 pounds W.O.G. Screwed ends, bolted flanged bonnet, inside screw rising stem. Body and bonnet are made of Ni-Resist, with 18-8S Mo Stainless Steel (Type 316) stem, seats, and wedge. Sizes ½" to 2", inclusive.

GATE VALVE *(upper right)* **Fig. 2195** for 200 pounds W.O.G. Flanged ends, bolted flanged bonnet, inside screw rising stem. Ni-Resist body and bonnet, with stem, seats, and wedge made of 18-8S Mo (Type 316) Stainless Steel. Sizes 1" to 3", inclusive.

GATE VALVE *(lower left)* **Fig. 2193** for 200 pounds W.O.G. Flanged ends, bolted flanged bonnet, outside screw rising stem and one-piece yoke. Body, bonnet, and yoke are Ni-Resist. Stem, seats, and wedge are 18-8S Mo (Type 316) Stainless Steel. Size 4".

LARGE SIZE GATE VALVE *(lower right)* **Fig. 2193,** 5" to 12", inclusive, for 200 pounds W.O.G. Flanged ends, bolted flanged bonnet, outside screw rising stem and two-piece yoke. Ni-Resist body, bonnet, and yoke, with 18-8S Mo (Type 316) Stainless Steel stem, seats and wedge faces.



It's a winning move every time you select Powell *Ni-Resist* Valves. For here is an alloy that has far greater corrosion and heat resistance than ordinary Cast Iron. Similar to gray iron, and resembling austenitic stainless steel in many ways, no other cast metal offers such a unique combination of useful properties.

Powell Ni-Resist Valves are especially adapted for handling pulp and paper mill liquors, oil refinery acids, alkalies and sludges, caustic soda, pickling solutions, sea water and many other fluids. Shown here are just a few of them to help you checkmate the high cost of corrosion. They're available through distributors in principal cities. If a distributor is not located near you, just write us—The William Powell Company, Cincinnati 22, Ohio. We'll be pleased to tell you more about these valves—or to help you with your valve problems. Powell has probably solved more valve problems than any other organization in the world.

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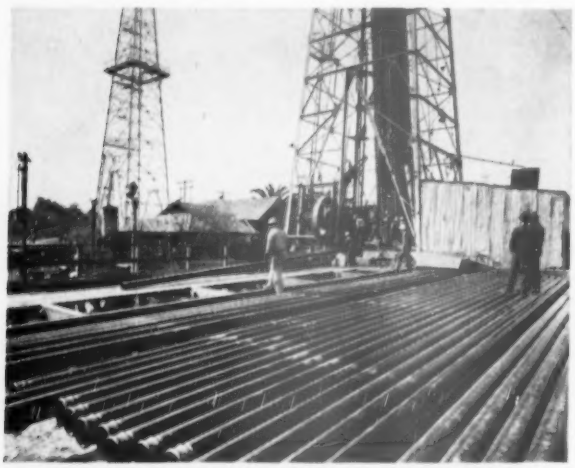
This is the most recent of our Petroleum Industry advertisements as presented to 10,000,000 readers of Time, Newsweek and U.S. News & World Report.
A. O. Smith Corporation

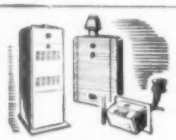
"FILL 'ER UP" is your command that spurs a great legion of engineers, business men, oil field and refinery workers to produce ever better, lowest cost fuel and lubricants for your car. Even at your corner service station, A. O. Smith dispensing pumps, computing meters and explosion proof motors are at work helping the Petroleum Industry serve you.



MILES UNDERGROUND, at oil's source, A. O. Smith is in partnership with the Petroleum Industry. As depth increases "collapse" and "pull-out" requirements become more critical. A. O. Smith cold-worked casing and couplings provide the necessary safety factor.

STEEL ARTERIES up to three feet in diameter carry petroleum products to market. Since 1927, A. O. Smith has produced nearly 35,000 miles of line pipe.

Automatic Water Heaters

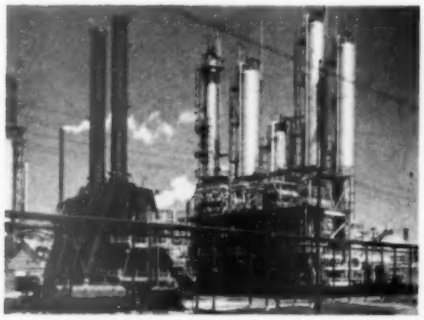


Home Heating Equipment

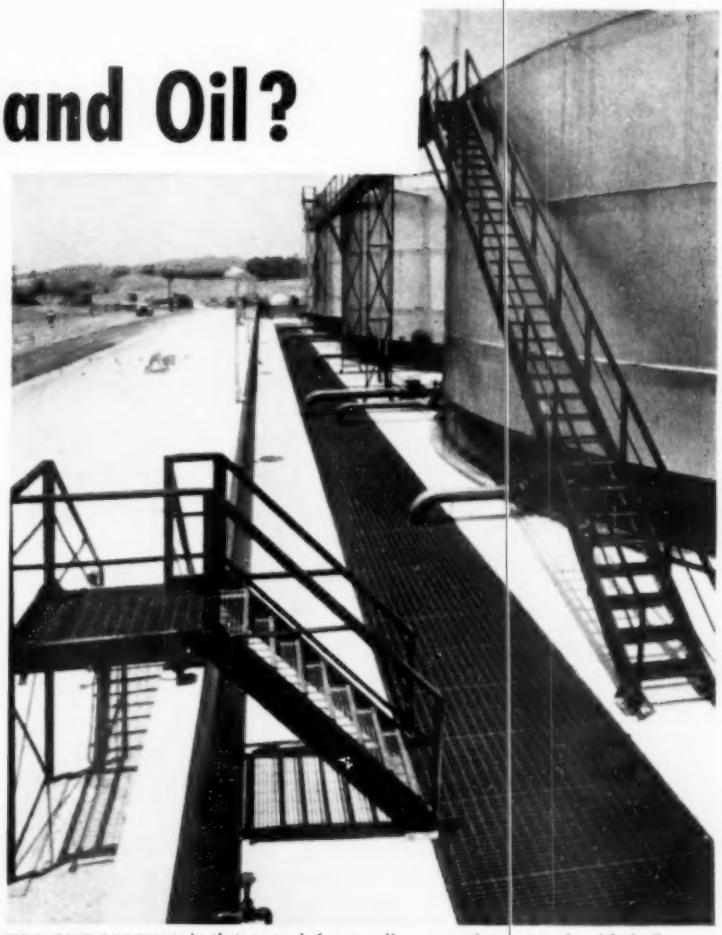
Welding Machines and Electrodes

without Gas and Oil?

How the Petroleum Industry and A. O. Smith help bring You better motoring at lower cost



TALL STILLS and "cracking" towers, withstand pressures of several thousand pounds per square inch, make high-octane gasoline for your car's powerful engine. Specialized process equipment of welded design, first built by A. O. Smith more than 25 years ago is still in service today.



NON-SLIP SAFETY is built into tank farm walkways and stair treads with A. O. Smith safety grating. Patented locked for life construction, with crossbars and bearing surfaces 100% serrated, costs no more than plain grating.

BARRELS OR GALLONS, measured to the fraction of an ounce! Whether under high pressure or gravity, oil or its liquid products flow through A. O. Smith frictionless petroleum meters, on distribution lines, at bulk stations and on tank trucks.

MASTERY OF STEEL
through RESEARCH and ENGINEERING

A.O.Smith
CORPORATION

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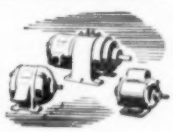
International Division: Milwaukee 1

11 Plants Located in New York • New Jersey • Pennsylvania • Ohio • Wisconsin • Illinois • Texas • California

You may have a free copy of this illustrated Product Folder. Simply write A. O. Smith Corp., Dept. OG-154, Milwaukee 1, Wis.

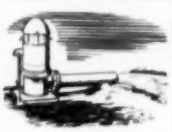
Feed and Bulk Storage Units



Electric Motors

Liquid Gas Systems

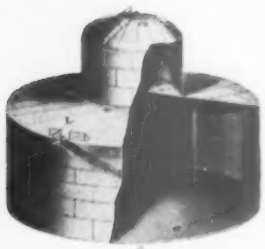
Automobile Frames and Control Arms



Vertical Turbine Pumps

Glass-lined and Stainless Tanks

the HAMMOND DIALIFT*



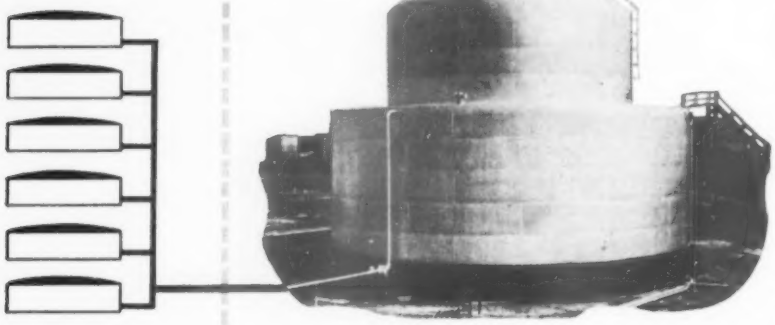
MONEY SAVER FOR PRODUCT-STORAGE OPERATORS!

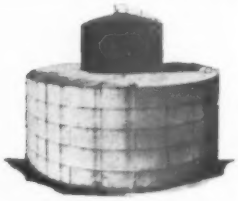
The Hammond DIALIFT is the modern tank for eliminating breathing losses and reducing filling losses. It gives maximum conservation of vapors at lowest cost.

42'6" x 40' Liquid Storage Tank 22' x 17'9" Dialift. Housing — 6500 cu. ft. capacity Inter connected to a 25' x 40' Cone Roof Tank

50' x 48' Liquid Storage Tank 30' x 15'9" Dialift. Housing — 12,500 cu. ft. capacity

The DIALIFT consists of a tubular membrane attached gas-tight to the inside periphery of a cylindrical housing. In operation the DIALIFT functions as the lung of the storage tank. The membrane lifts under a slight pressure when additional vapor storage space is needed, and lowers when less vapor space is required; self-adjusting to the constantly changing breathing conditions within the tank.





80' x 30' Liquid Storage Tank 35' x 17'9" Dialift. Housing — 20,000 cu. ft. capacity

It is easy to convert an existing Cone Roof Tank to an efficient DIALIFT installation. A DIALIFT housing is superimposed on the existing roof, breather holes are installed through the roof plating permitting a free passage for all vapors, no other preparation is necessary.

60' x 48' Ground Type Dialift. 150,000 cu. ft. capacity

*patented

Bulletin 53DL details and describes the Hammond Dialift . . . *Write for your copy.*

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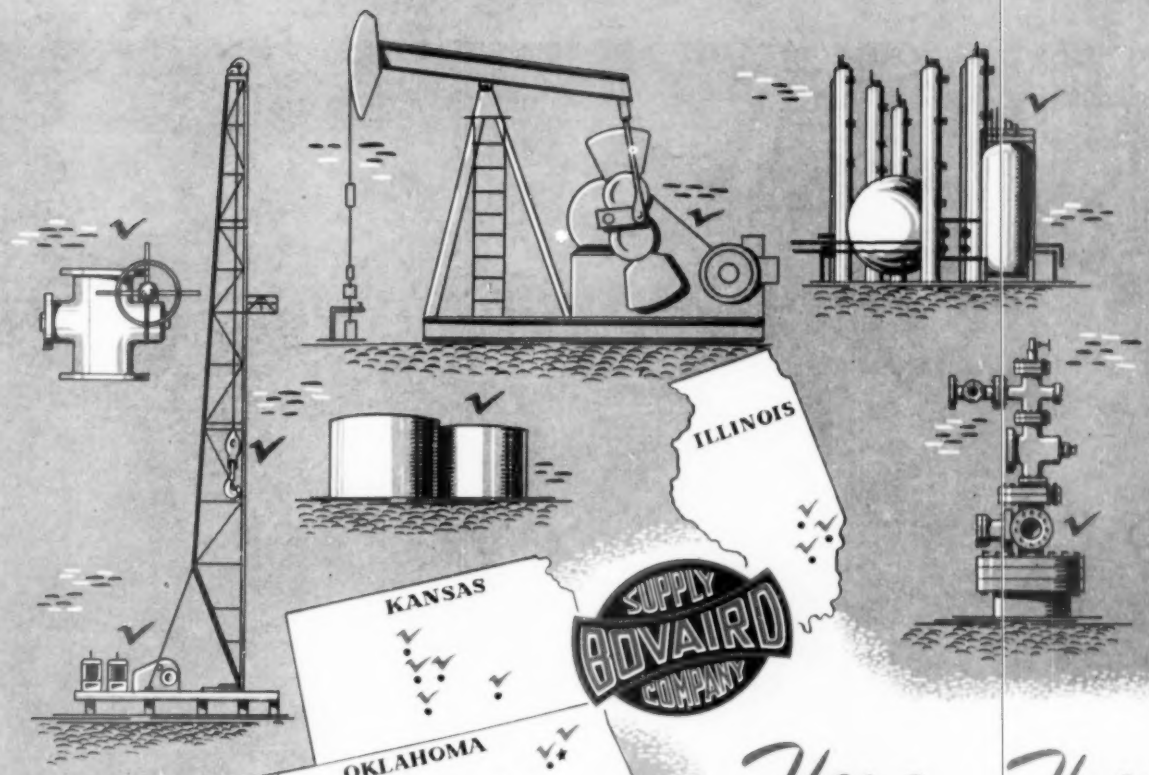
ON THE PACIFIC COAST BY **LACY** *MFG. CO. • LOS ANGELES, CAL. • IN CANADA BY* **VULCAN** *IRON & ENG. LTD. • WINNIPEG*



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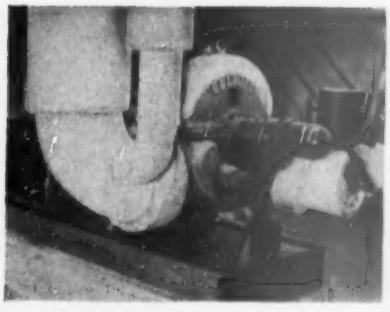
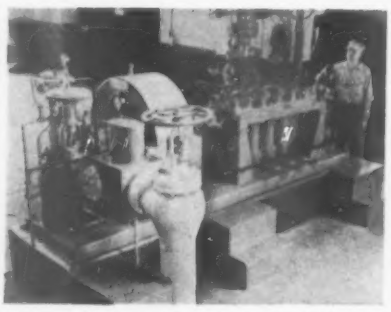
83 YEARS OF PROGRESS WITH THE OIL INDUSTRY

ELLIOTT TURBINES

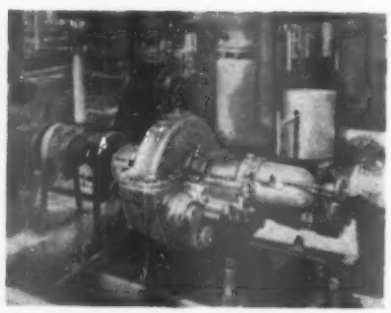
Clean, simple lines reflect the advanced engineering and manufacturing skill that has gone into building this modern, efficient turbine. It's the turbine that offers everything — adaptability, reliability, economy and a recognized reputation among plant engineers as one of the finest, most dependable turbines available anywhere.



Elliott 360-hp, 3550-rpm turbine driving a boiler-feed pump in a paper mill, exhaust steam being used in process.



Elliott 500-hp turbine driving a hydraulic system pump in a steel mill. Turbine maintains constant pump discharge pressure.



One of a group of Elliott turbines driving lean oil pumps in a cycling plant, where reliability is especially important.

A standard turbine— yet "tailor-made" to your requirements

Elliott Turbines can be adapted to practically any operating condition or service

That's because these powerful, compact turbines are designed to give you the advantages of custom-built adaptability at savings achieved through mass production of standardized parts. A wide variety of permissible modifications are possible. For instance... five sizes of YR turbines cover the entire range of capacities up to 2000 hp, speeds from 800 to 7000 rpm and back pressures from 4 in. Hg to 250 psig. Standard designs of rotor, governor, bearings, bearing cases, steam chest, governor valves and governor linkage are used throughout. In the case of higher pressures and temperatures up to 850 psig and 900 F, materials for steam parts may be changed from cast iron to steel.

Here are a few of the design highlights that are included in Elliott turbines:

Air-wall labyrinth seals to protect bearings from contamination without rubbing contact.

Centerline support to provide constant alignment under any operating condition.

Stainless steel spray coating under packing glands to eliminate corrosion of the shaft.

Choice of many governors to meet specific control requirements.

Liner type bearings to eliminate the need for scraping and fitting.

Packing glands removable without raising turbine upper half casing to simplify inspection and maintenance operations.

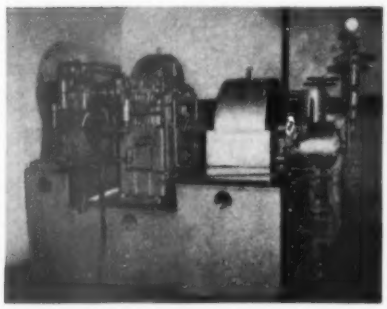
Stainless steel buckets and shroud to assure maximum life and continued high efficiency.

These and many other features are *standard* in Elliott turbines. They are the result of years of practical experience in the application of turbines to hundreds of different types of plant equipment and to many different types of operating and steam requirements.

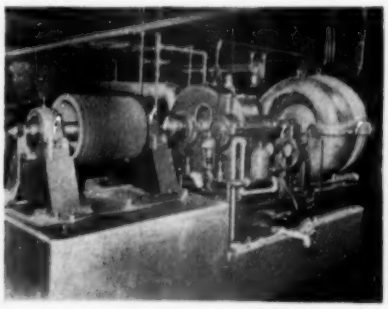
Full details on Elliott Mechanical Drive Turbines can be obtained from your local Elliott representative or by writing Elliott Company, Jeannette, Pa., for a descriptive bulletin.

ELLIOTT Company
STEAM TURBINE DEPARTMENT

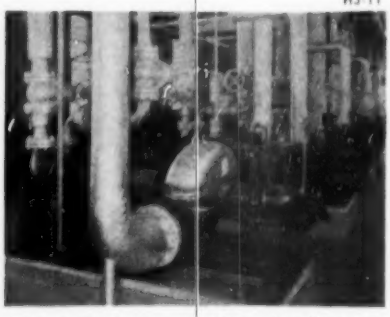
H3-11



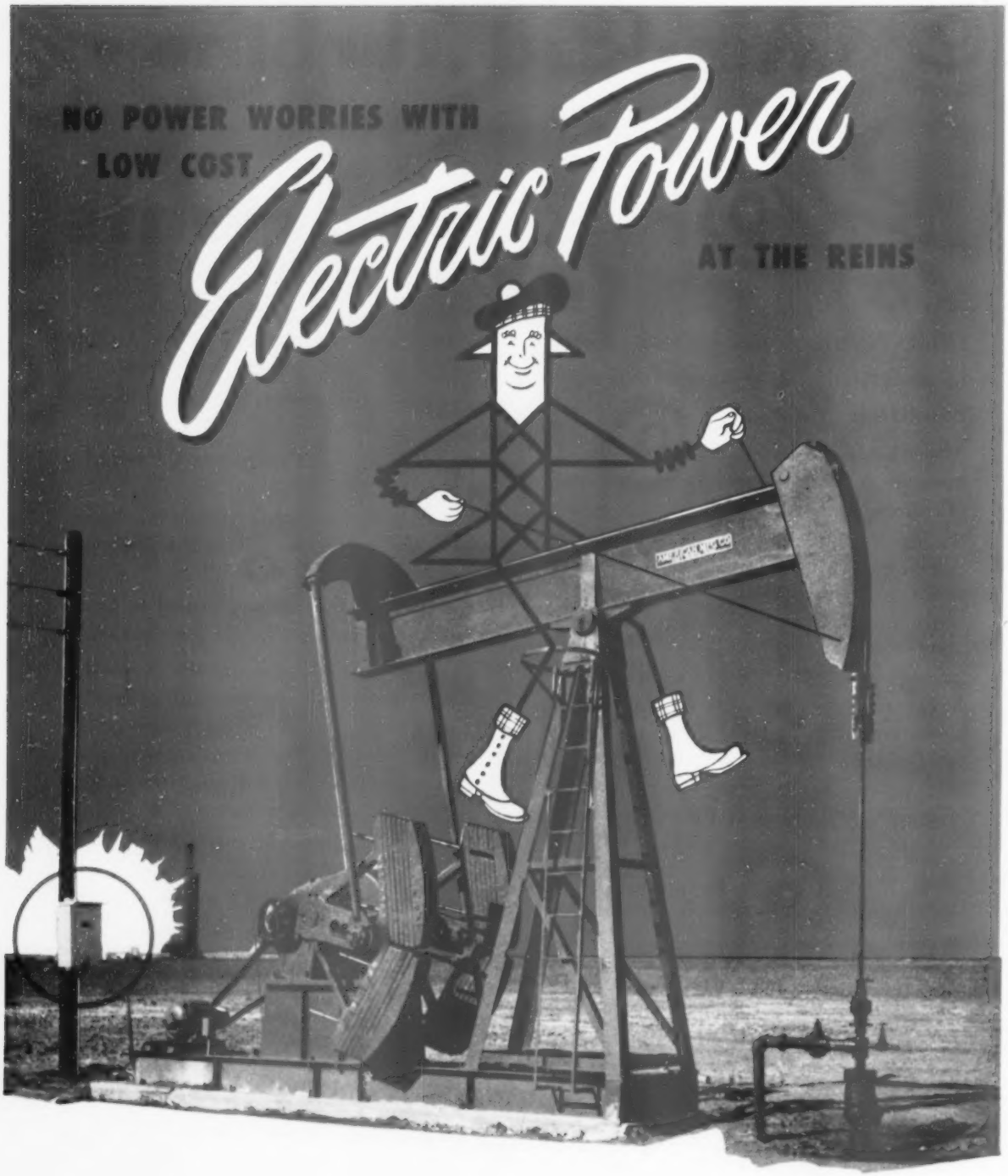
This Elliott 202-hp turbine drives an induced-draft fan through a separate reduction gear, in a midwestern generating station.



An Elliott 250-hp geared multi-stage turbine driving a paper machine. Governor gives close regulation over a wide speed range.



This line of oil pumps is driven by Elliott turbines. This is one of many refinery applications for Elliott turbines.



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CALL YOUR NEAREST ELECTRIC SERVICE COMPANY FOR MORE FACTS OR ADDRESS YOUR REQUEST TO P. O. BOX 2771, DALLAS, TEXAS

With Low Cost Purchased Electric Power at the reins, oil field power worries end. This Electrically Powered pumping unit in West Texas, for example, gives the operator constant dependable service year around regardless of weather. And not only is LCP* dependable and clean, but it's *the most economical oil field power* obtainable. Hand over your power reins to LCP and end your own power worries. Contact your nearest Electric Power representative — *today!*

*Low Cost Power

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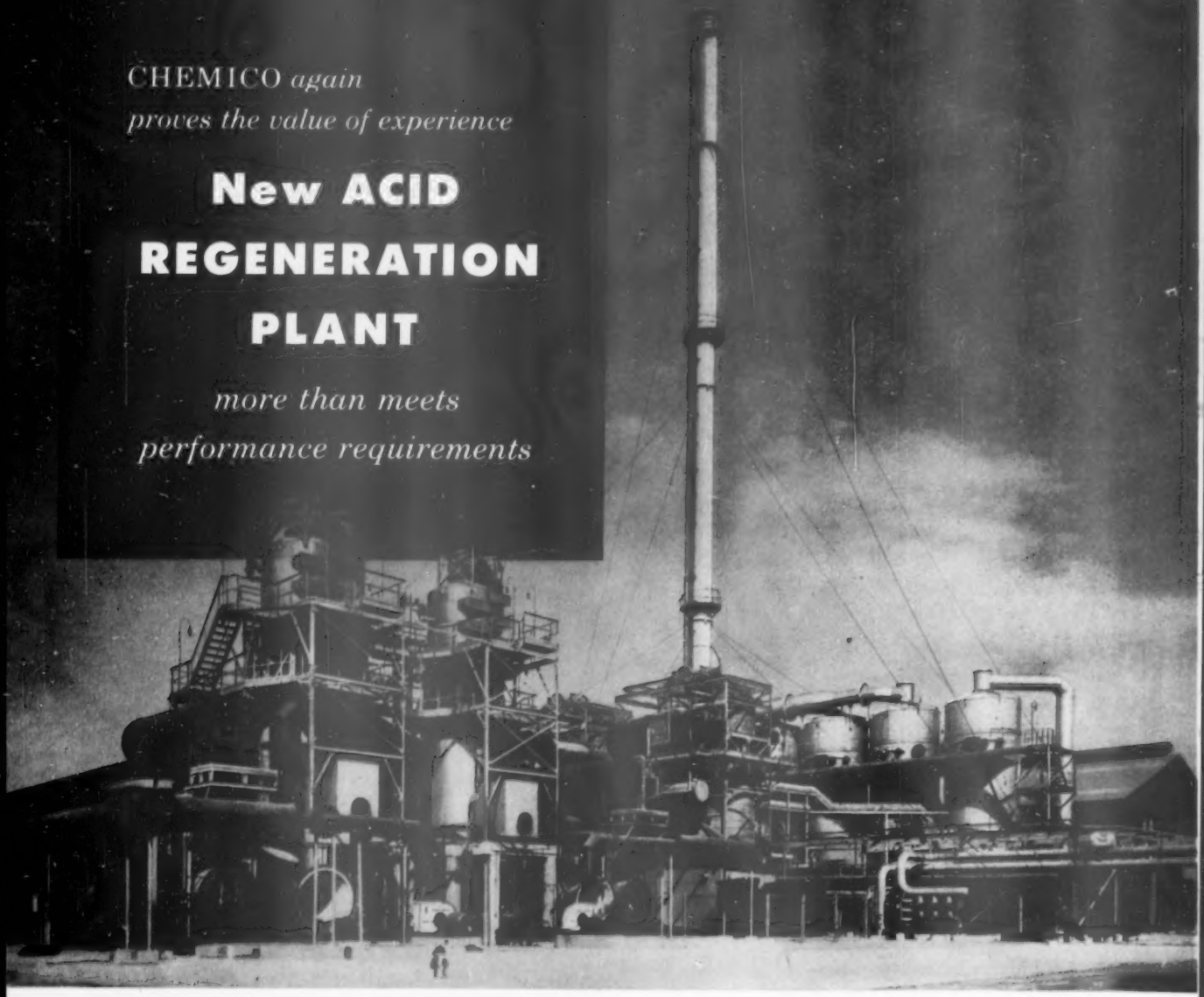
CHEMICO *again*
proves the value of experience

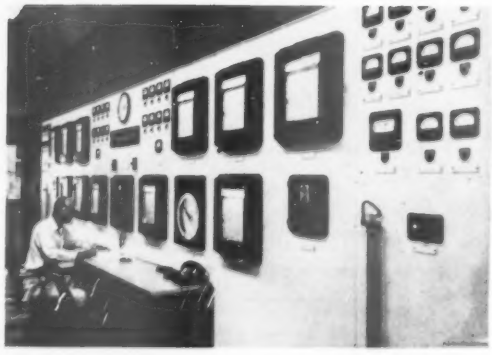
New ACID REGENERATION PLANT

more than meets performance requirements



For 39 years Chemico has been supplying industry's needs for chemical plants of various types. This new plant designed and built for Consolidated Chemical Industries in Baton Rouge, Louisiana, for the production of fresh acid from waste refinery sludges is a recent example.

"On stream" and producing more than guaranteed production of 400 tons of acid per day promptly and without the need for major adjustments—that's the result of EXPERIENCE.



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you get

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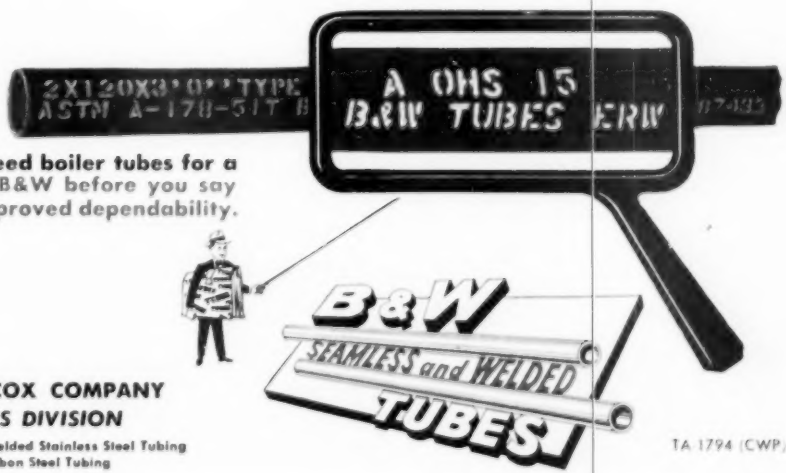
B&W Welded Boiler Tubes

Uniform wall thickness, diameter, and concentricity . . . uniform physical properties and characteristics . . . *consistent uniformity from tube to tube* for easier fabrication and rolling-in, greater strength, and longer life between retubings.

You'll find B&W Welded Boiler Tubes giving long and faithful service in boilers of all types and pressures—from the lowest to the highest—and serving the widest variety of applications. You'll recognize B&W tubes by their "brand".

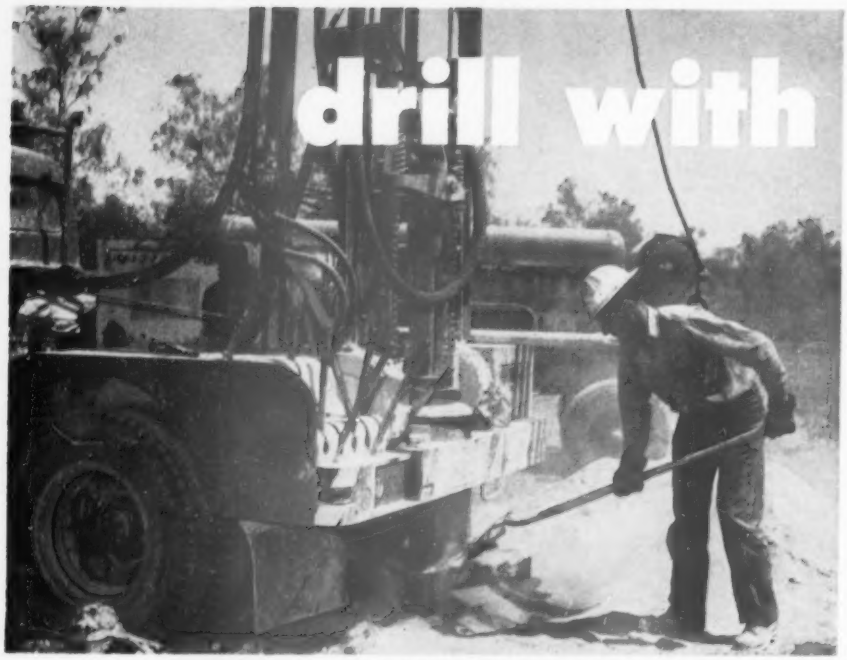
LOOK FOR THIS
—wherever fine boilers are operating efficiently over extended periods.



***Ask for them* the next time you need boiler tubes for a new boiler or retubing job.** Say B&W before you say WELDED BOILER TUBES—for service-proved dependability.

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

TA 1794 (CWP)



when water won't do—

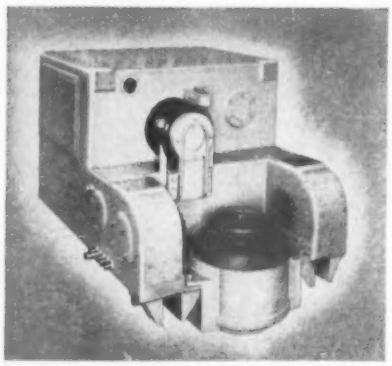
Air drilling in West Texas with the new TI Shot Hole Rig.

use TI's versatile Shot Hole Rig!

IN WATER-SCARCE AREAS, air drilling with TI's versatile, portable Shot Hole Rig is solving the tough problem of thirsty formations. Drilling with air—and TI's new drill—removes the cuttings from the hole quickly and economically.

And whatever the area—dusty *or* damp—the sealed-unit construction of the new INTEGRATED POWER DRIVE protects the machinery. Gears, chains, clutches, and other moving parts are completely sealed in a single case and continuously spray-lubricated with *filtered* oil.

For *any* drilling problem—whether it calls for air, water or casing drilling—the TI Shot Hole Rig will give you lower cost per foot of hole.
Write *today* for complete literature.

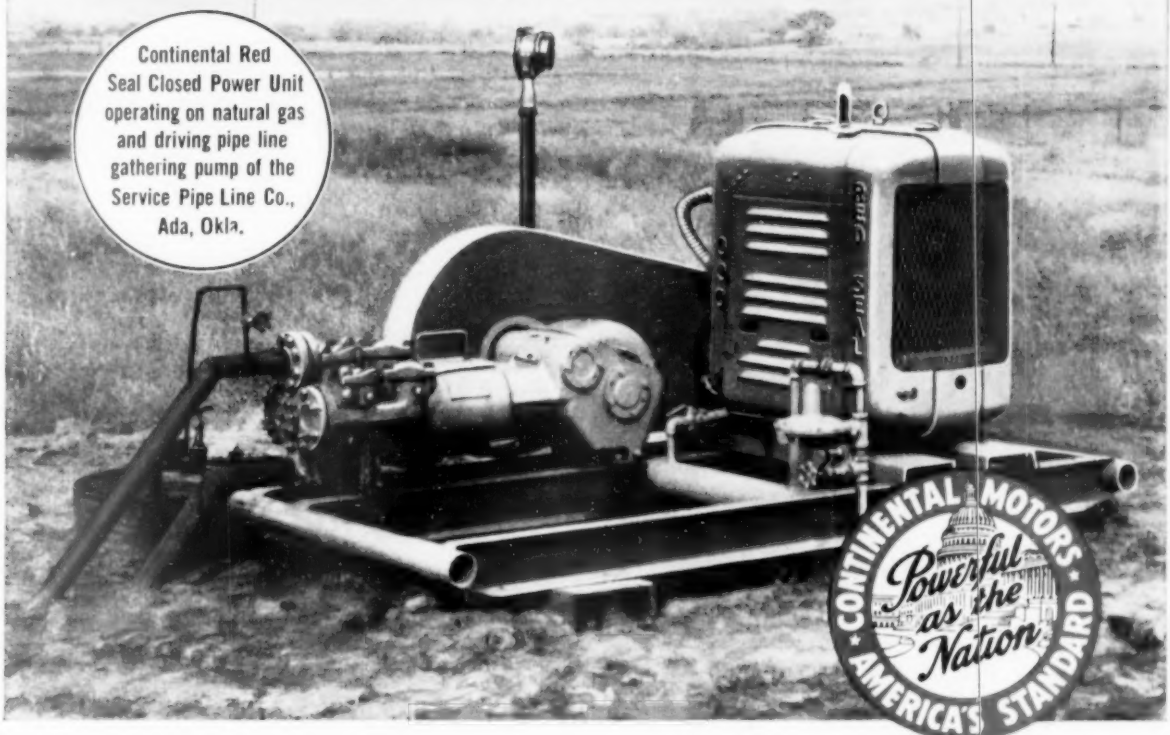


NEW INTEGRATED POWER DRIVE

Long life and low maintenance costs are inherent in the sealed-unit construction of the INTEGRATED POWER DRIVE, heart of the TI drill. All the components necessary for the transfer and control of power have been brought together in a *single* case with centrally located controls. Rotary table, pull down drive, kelly hoist, hoist drum, and pump drive are so integrated with the primary power drive that transfer of power for *all* drilling operations is accomplished in a *single sealed unit.*

TEXAS INSTRUMENTS
INCORPORATED
6000 LEMMON AVENUE DALLAS 9, TEXAS

HERE'S MORE POWER TO YOU ...AT LOWER OVER-ALL COST


Continental Red Seal Closed Power Unit operating on natural gas and driving pipe line gathering pump of the Service Pipe Line Co., Ada, Okla.
CONTINENTAL MOTORS
Powerful as the Nation
AMERICA'S STANDARD

The equipment builder who powers his product with Continental Red Seal engine – and the user of such equipment – both benefit from specialized experience that goes back a long, long time. They profit by engineering features, and advances in production technique, evolved over a period of more than 50 years. Ever since 1902, Continental dependability, economy and stamina have been building prestige for quality leaders in the transportation, farm and industrial equipment fields – in oil field producing, distribution, processing . . . providing more and better power, at lower over-all cost.

•

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Continental Motors Corporation

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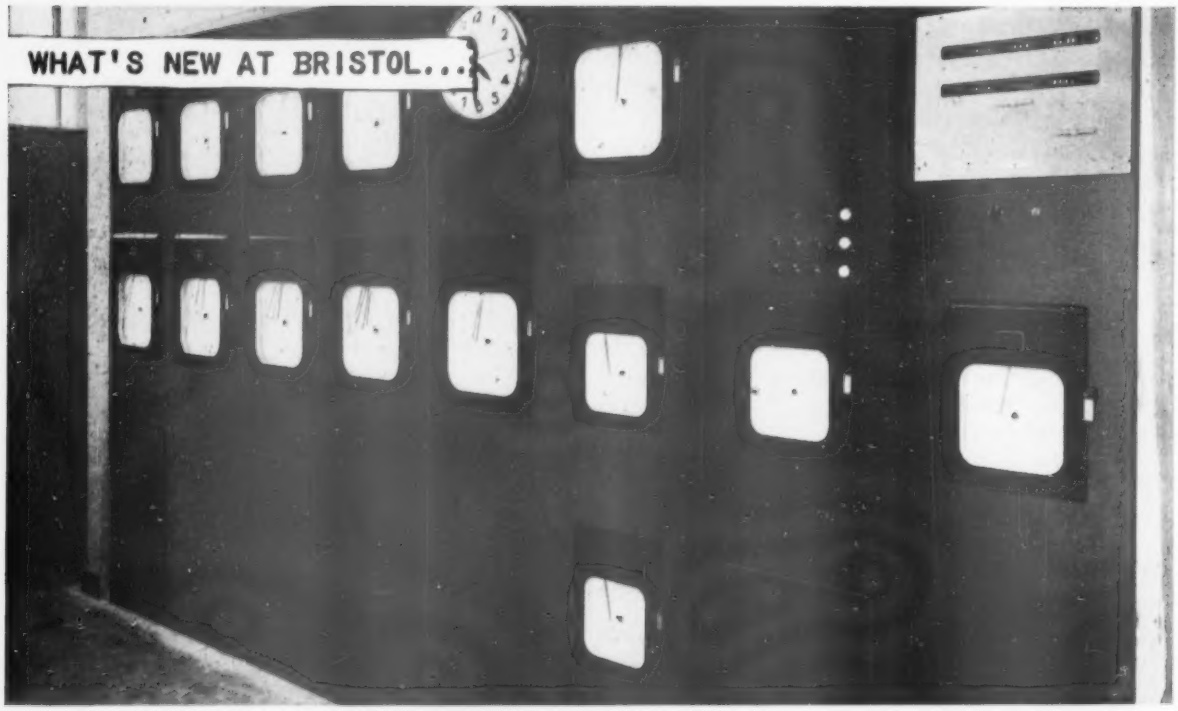
910 S. BOSTON ST., ROOM 1008, TULSA, OKLA. • 1252 OAKLEIGH DRIVE, EAST POINT (ATLANTA) GA.



IN SAN FRANCISCO. Control panel at the new Point Richmond Holder Station of the Pacific Gas and Electric Co. The Bristol Metameter Receivers on this panel record readings of flow and pressure at focal points of load in the natural gas distribution and transmission systems for San Francisco Bay section. This installation is part of an elaborate system of Metameter Telemetering and remote control, involving distances up to 50 miles, used on this company's far flung network of pipe lines throughout northern and central California. This company is using Metameters that have been in operation since 1935.

From California to New England

... it's Bristol all the way

For over 20 years, the Bristol Metameter Telemeter has been recognized throughout the nation as the finest and most reliable instrument of its kind.

That's why today the Metameter is the most widely used instrument in the telemetering field.

From coast to coast, the Metameter has been serving the needs of oil and gas men everywhere. Find out how the Metameter can solve your measurement, recording or control problem, too. Write today for our free 40-page Bulletin M1710. The Bristol Company, 120 Bristol Road, Waterbury, Conn.

IN SPRINGFIELD, MASS. Dispatching Office of Northeastern Gas Transmission Co., in Springfield, Mass. Pressure readings from six New England points are received by the two Time-Multiplex Receivers shown on the bottom of the panel and individually recorded by the 9 Metameter Receivers. With the new Bristol Multiplexing equipment, up to 15 readings can be transmitted over a single circuit. Thus, tremendous savings are made in circuit costs. .3.34

LOOK FOR OUTSTANDING NEW DEVELOPMENTS FROM BRISTOL

BRISTOL

THE DEPENDABLE GUIDEPOST OF INDUSTRY

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

STOP WASTE IN OIL FIELD HOUSING....

You eliminate waste in oil field housing when your houses are manufactured by STURDYBILT. No left over lumber which you have paid for, but not used. No special construction plans which cost extra money. No weeks of waiting for houses to be built.

STURDYBILT Houses are prefabricated at the factory. They arrive at your site complete, and can be erected in days instead of weeks. When you move, take your STURDYBILT Houses with you. There is little or no loss of material except underground installation and foundation so you save most of your investment.

■ MANUFACTURERS OF SPECIAL MILLWORK: DISTRIBUTORS OF CURTIS WOODWORK AND JOHNS-MANVILLE BUILDING MATERIALS

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STURDYBILT

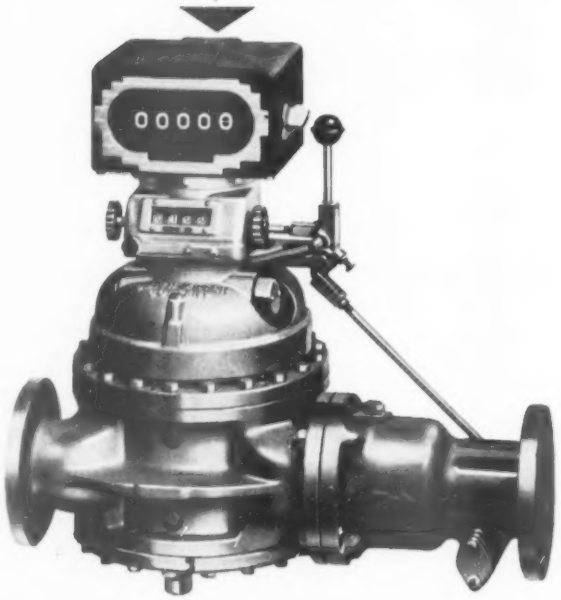
PREFABRICATED, DEMOUNTABLE HOUSES

SOUTHERN MILL & MANUFACTURING CO. • TULSA, OKLAHOMA

STURDYBILT HOUSES COMPLY WITH COMMERCIAL STANDARD CS125 OF THE NATIONAL BUREAU OF STANDARDS FOR PREFABRICATED HOMES

Better way to blend!

Batch blending of casinghead gasoline from pressure storage with motor fuel in atmospheric storage tanks is accomplished by this installation with *greater accuracy* and at *lower cost*. Does away with the uncertainties of gaging. Handles any size batch, large or small. Requires minimum attention. Set the quantity desired, then walk away and leave it. Shuts off automatically. Furnishes printed ticket showing exact amount of casinghead delivered. Similar systems for blending butane, propane, etc. For complete information, see nearest representative or write, A. O. Smith Corporation, Meter Division, 5715 SMITHway St., Los Angeles 22, Calif.



80th YEAR

A.O.Smith

METER DIVISION

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Offices: Atlanta, Chicago 7, Houston 20, Los Angeles 22, New York 17
Canada: Toronto 12, Vancouver 1. International Div. — Milwaukee 1, Wis.

Top – Typical Casinghead Blending Installation at a large Midwestern Refinery – Model S-35 A. O. Smith Positive Displacement Meter equipped with Set Stop Counter, Slow-Closing Set Stop Valve, Large Numeral Counter and Ticket Printer. Installation includes Temperature Compensator and a Meter-Switch which automatically starts and stops the motor driven pump.

Bottom – Star performer of this installation is the A. O. Smith Slow-Closing Set Stop Valve, accurate at both low and high flow rates. This is just one of the many functional accessories which let you DO MORE WITH SMITH METERS.

Tough Packaging Job...

TRANSPORTING caustic soda in liquid form involves exacting requirements. Liquid caustic must be insulated to keep it hot, especially when in its higher concentrations—73% solutions, for example, will solidify even in normal summer weather. It must be strongly encased—but since it reacts chemically with many substances, its purity must be protected against metallic contamination. Ease of loading and unloading liquid caustic and the safety of workers are also of prime consideration.

Columbia-Southern pioneered most of the developments which solved the major problems in this tough packaging job—which have enabled many companies to realize economic and processing advantages through the use of liquid caustic soda rather than solid. These achievements are among the numerous reasons why Columbia-Southern is one of the world's leading producers of alkalies, chlorine and other chemicals essential to industry.

THE "COLUMBIA" CAR—Columbia-Southern has been instrumental in the design and introduction of so many features of caustic soda tank cars that even prototypes of its own fleet are frequently referred to as "Columbia" cars. Among those developments which Columbia-Southern pioneered are the PATENTED LINING, which is caustic resistant and which first made practicable the shipment of 73% caustic without metallic contamination; the FUSION WELDED TANK, as applied to caustic cars, for greater strength and protection against leakage; IMPROVED INSULATION, including the use of fiber glass, for greater protection against freezing; EXTERIOR CHANNEL-TYPE HEATING COILS, for longer life and elimination of leak sources; LEAK-PROOF OUTLET VALVE for positive control.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

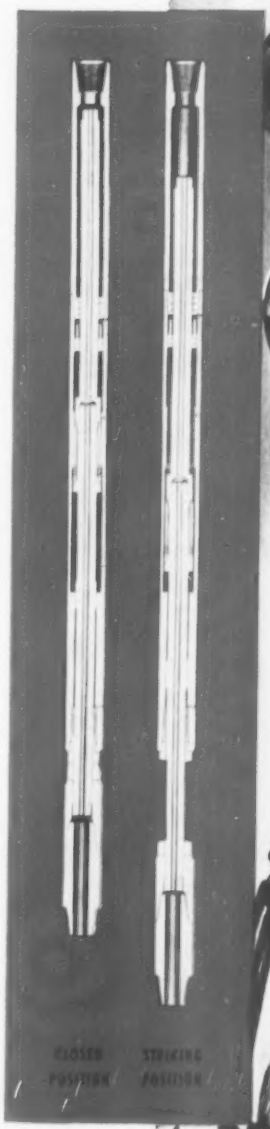
EXECUTIVE OFFICES: One Gateway Center, Pittsburgh 22, Pennsylvania

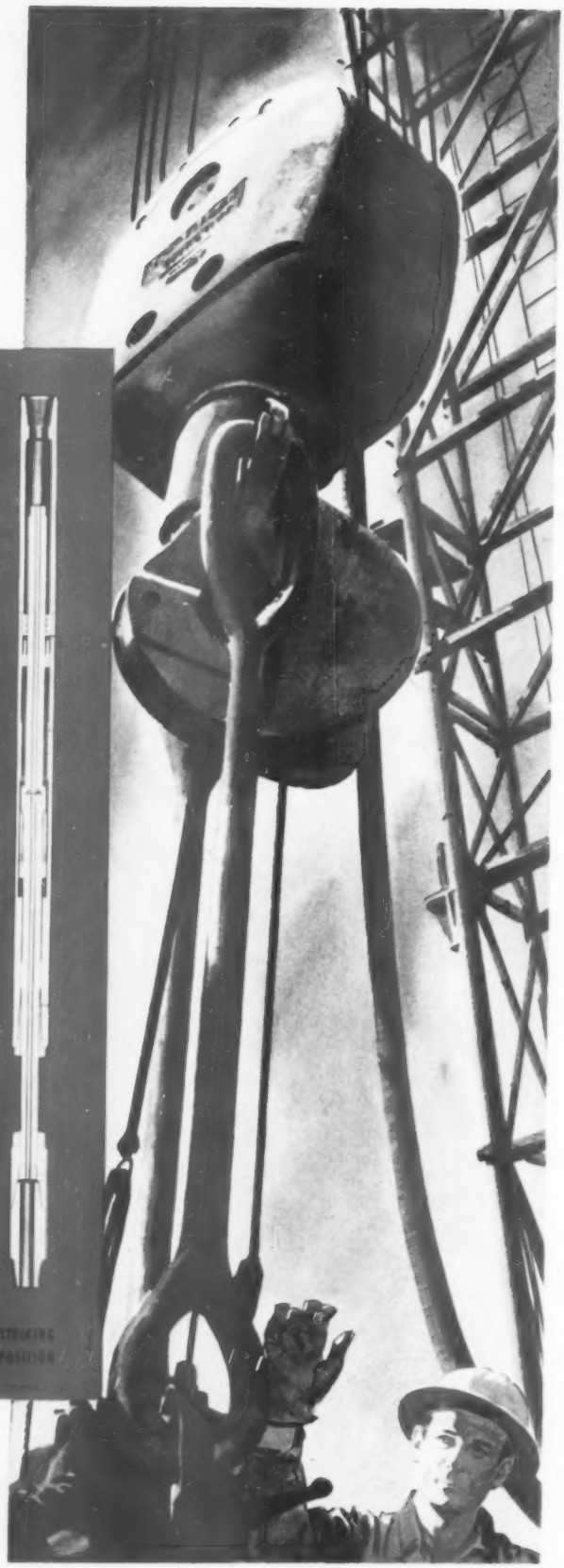
DISTRICT OFFICES: Boston, Charlotte, Chicago, Cincinnati, Cleveland, Dallas, Houston, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, St. Louis San Francisco

CAUSTIC POTASH IS SUPPLIED FROM COLUMBIA-SOUTHERN'S PLANT AT CORPUS CHRISTI, TEXAS

A tap, haymaker or an earthquake

THE JOHNSTON-SUTLIFF HYDRAULIC JAR HITS ANY DESIRED BLOW AT ANY TIME WITHOUT A ROUND TRIP





This exceptionally rugged self-contained hydraulic tool is now available in all areas. Over 5000 successful jobs in three years have proven the advantages of the Johnston-Sutliff hydraulic jar. Its advantages of simplicity of operation, straight pull, only two moving parts, O.D. size same as the tool joint on which it is run, and availability in all drill pipe sizes, has won its acceptance as "standard" on formation testing jobs wherever it has been available.

Here's the jar to meet any condition without pulling the tool out of the hole on any fishing job, whether it be a liner or string of drill collars.

For more details write for Booklet JSJ

JOHNSTON TESTERS INC.

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Export Division: 3035 Andrita St., Los Angeles 65, Calif.

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25 SERVICES 1 TRIP TO THE WELL

THE OLD DUTCHMEN SAID SPEAKING IS SILVER AND SILENCE IS GOLD! SCHLUMBERGER SERVICE IS HELD IN STRICT CONFIDENCE

TIME IS MONEY AT THE WELL PRINTING AND DELIVERY OF COMPLETE PRINTS AT THE WELL

THE OLD DUTCHMEN SAID: DE COST GAET VOOR DE BAET UIT (THE EXPENSES PRECEED THE PROFIT) SCHLUMBERGER BELIEVES THAT MONEY SPENT ON RESEARCH PAYS IN THE LONG RUN

PREVENTIVE MAINTENANCE

30 SHOTS IN THE WALL OF THE WELL AT THE WILL OF THE OPERATOR: THE SAMPLE TAKER

SELECTED ENGINEERS

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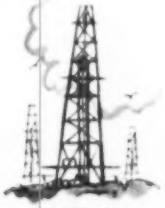
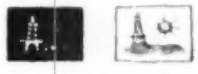
EVERY LOG A QUALITY PRODUCT

THE OLD DUTCHMEN SAID: 'Throw a smelt to catch a pike.' THE PRICE OF A SCHLUMBERGER IS NEGLIGIBLE COMPARED TO THE LOSS OF AN OIL FIELD



WELL QUALIFIED PERSONNEL



NIGHT AND DAY

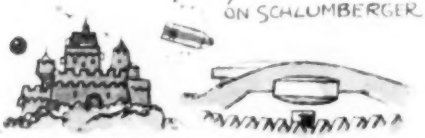
Schlumberger service with a smile

THE OLD DUTCHMEN SAID: 'Don't buy turnips for lemons' YOU CAN DEPEND ON SCHLUMBERGER

ANYWHERE

24 HOURS ROUND THE CLOCK

ANY TIME



WALLS CHANGED, GUNS HAD TO CHANGE TOO! SCHLUMBERGER EQUIPMENT KEEPS STEP WITH PROGRESS

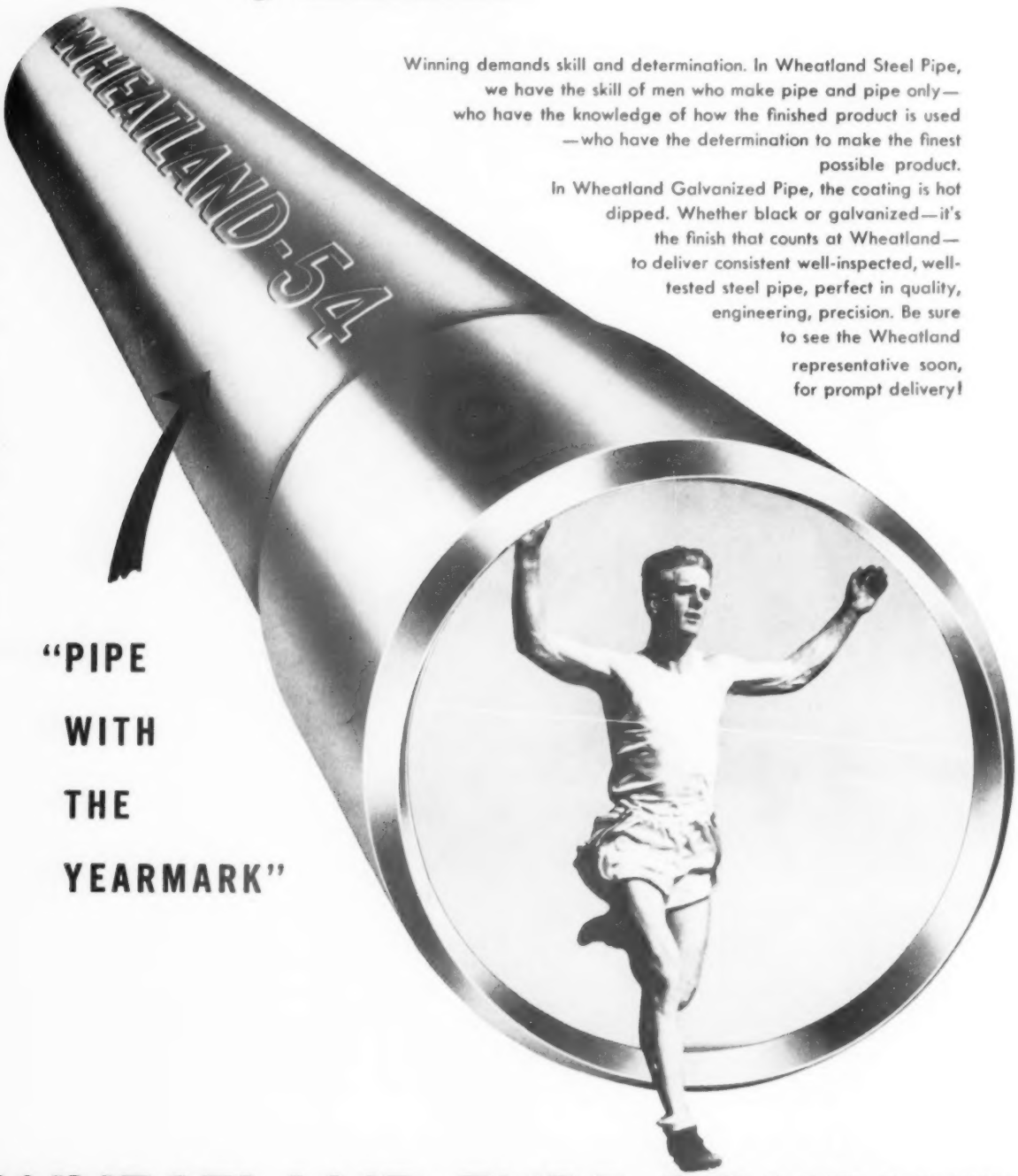
ANY WAY!

ENGINEERS TRAINED BY EXPERTS

WHY OPERATORS PREFER SCHLUMBERGER

Schlumberger Well Surveying Corp. • Houston, Texas

its the finish that counts



Winning demands skill and determination. In Wheatland Steel Pipe, we have the skill of men who make pipe and pipe only—who have the knowledge of how the finished product is used—who have the determination to make the finest possible product.

In Wheatland Galvanized Pipe, the coating is hot dipped. Whether black or galvanized—it's the finish that counts at Wheatland—to deliver consistent well-inspected, well-tested steel pipe, perfect in quality, engineering, precision. Be sure to see the Wheatland representative soon, for prompt delivery!

"PIPE WITH THE YEARMARK"

WHEATLAND TUBE COMPANY

Bankers Securities Building Juniper & Walnut Sts., Philadelphia 7, Penna.

Why this special oil field jack will give longer trouble-free service

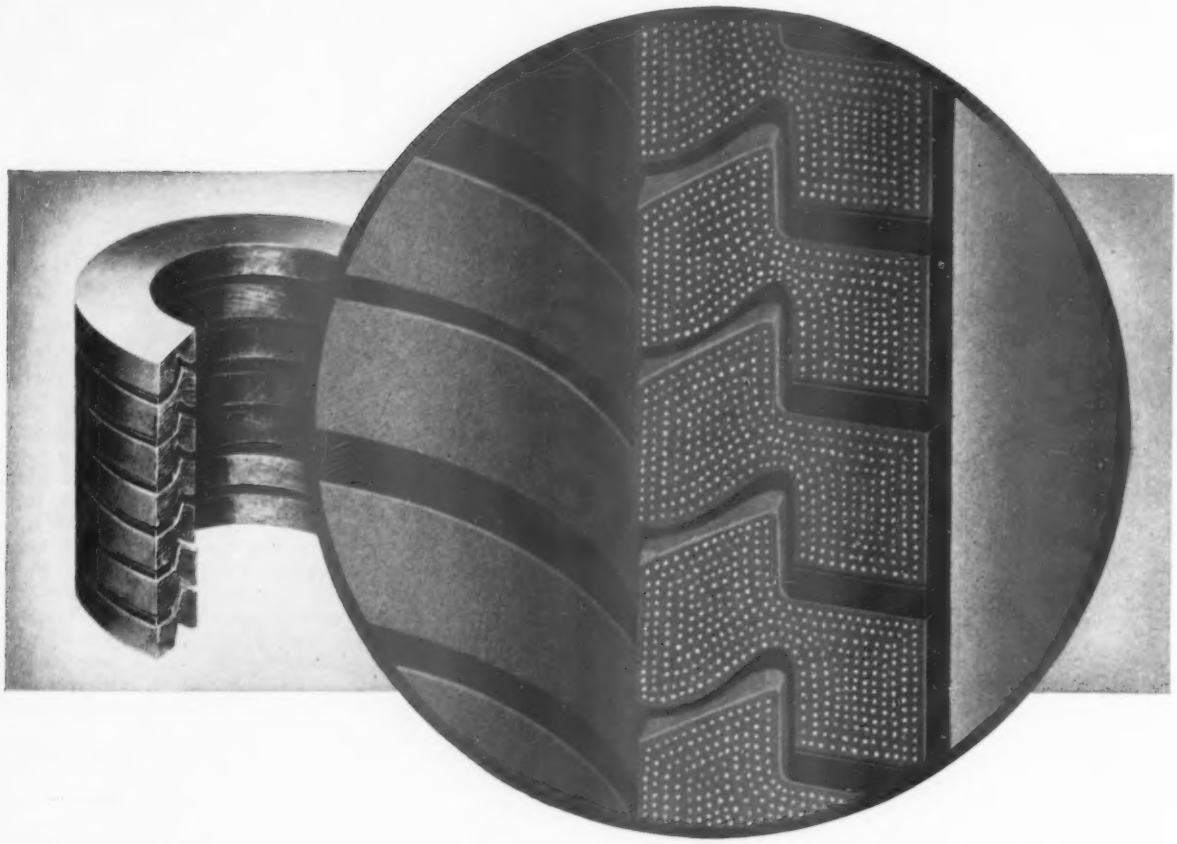
the Roustabout "1523"

When Duff-Norton engineers set out to design safer, longer-lasting jacks for men who work in the oil fields, they discovered one startling fact—about 90% of jack maintenance was in replacing worn springs in the mechanism that controls the jack's raising or lowering action. Result? The Duff-Norton Roustabout "1523" oil field jack is equipped with a patented*, adjustable spring mechanism which assures positive engagement of rack teeth. The spring's tension can be easily adjusted with a screw driver without removing any part of the jack. Should the spring eventually lose its resiliency, there's no need to send the jack to a repair shop. A new, complete spring mechanism assembly can be quickly installed by anyone in a matter of minutes right in the field, making the jack as good as new!

Complete with detachable steel chain, this versatile jack can be operated at any angle at its full 15-ton capacity. Ask your supply store salesman for the Duff-Norton Roustabout "1523." He has it in stock or can get it for you quickly. For complete specifications on this and other dependable Duff-Norton jacks, write the world's oldest and largest manufacturers of lifting jacks for special Oil Field Jack Bulletin AD19B, The Duff-Norton Manufacturing Co., P. O. Box 1889, Pittsburgh 30, Pa. Canadian Plant—Toronto 6, Ontario.

"Giving Industry A Lift Since 1883"

DUFF-NORTON *Jacks*



R/M "Vee-Square" mud pump packings need no sensitive gland adjustments

For heavy duty service in the oil fields, you won't find better packings than R/M "Vee-Square"* Rings. They seal efficiently; are easier on rods; and, unlike ordinary V-ring packings, do not require sensitive, finger-tip adjustment.

Take a look at the cut-away view of their construction. Note the solid square section—it absorbs gland pressure, keeps the packing from rolling and riding the rod. Note the V-design—it assures automatic sealing. Note the soft rubber cushion between the rings—it prevents blow-by and compensates for any overtightening.

*Patent pending

R/M MAKES A COMPLETE LINE OF PACKINGS AND GASKETS AND SELLS THEM ONLY THROUGH AUTHORIZED DISTRIBUTORS

R/M PACKINGS
RAYBESTOS-MANHATTAN, INC.
PACKING DIVISION, MANHEIM, PA.

If lowering your mud pump rod costs interests you, write today for our free bulletin on R/M "Vee-Square" Packing Rings.

FACTORIES: Bridgeport, Conn.; Manheim, Pa.; No. Charleston, S.C.; Passaic, N.J.; Neenah, Wis.; Crawfordsville, Ind.; Peterborough, Ontario, Canada

RAYBESTOS-MANHATTAN, INC., Packings • Asbestos Textiles • Industrial Rubber, Engineered Plastic, and Sintered Metal Products • Abrasive and Diamond Wheels Rubber Covered Equipment • Brake Linings • Brake Blocks • Clutch Facings • Fan Belts • Radiator Hose • Bowling Balls

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New MID-CONTINENT *Outpost*

Another step in Mid-Continent Supply Company's never ending efforts to provide the best oil field service obtainable — "Wherever There Is Oil" — through the strategic location of fully staffed, completely equipped field supply stores. Newcastle, Wyoming, is now supplying the needs of the oil industry in the great Wyoming-Montana area.

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FIELD SUPPLY STORES

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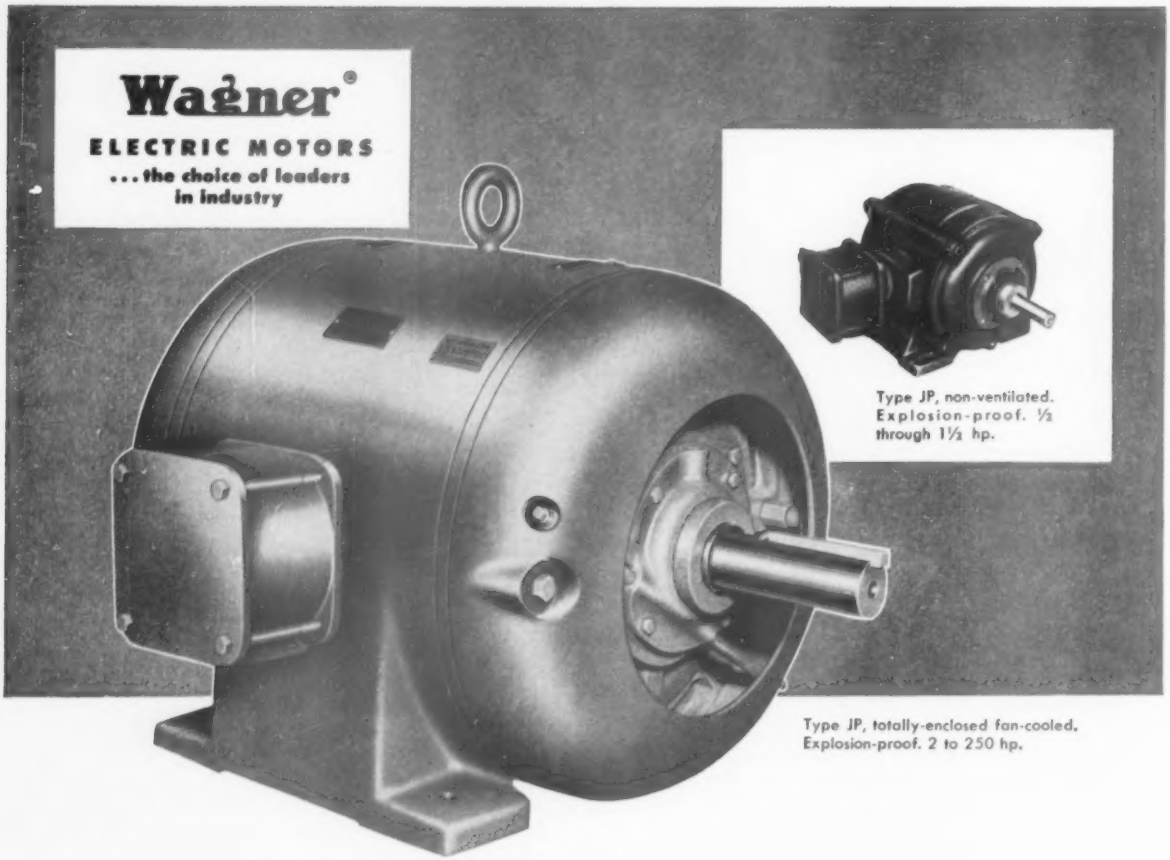
MID-CONTINENT
Supply Company
MID-CONTINENT BLDG. FORT WORTH, TEXAS

Wagner®
ELECTRIC MOTORS
...the choice of leaders in industry



Type JP, non-ventilated. Explosion-proof. ½ through 1½ hp.

Type JP, totally-enclosed fan-cooled. Explosion-proof. 2 to 250 hp.

for extra protection against corrosion

SPECIFY Wagner CAST IRON FRAME MOTORS

Here are stock motors specifically designed for use in chemical plants, oil fields, refineries, steel mills—for rugged industrial applications where dust, dirt, moisture, or corrosive vapors are present.

These motors are totally-enclosed in corrosion-resistant cast iron and all parts exposed to the atmosphere are of corrosion-resistant material—including the nameplate. They feature completely protected laminations . . . special varnish treated windings . . . and a running shaft seal.

Wagner Cast Iron Frame Motors are available in fan-cooled standard and explosion-proof types in ratings from 2 to 250 hp, and in non-ventilated standard and explosion-proof types in ratings from ½ through 1½ hp. Wagner Bulletin MU-132 gives complete information.

A skilled Wagner engineer can help you select a Wagner Motor to meet your most exacting specifications. Call the nearest of our 32 branch offices, or write us.

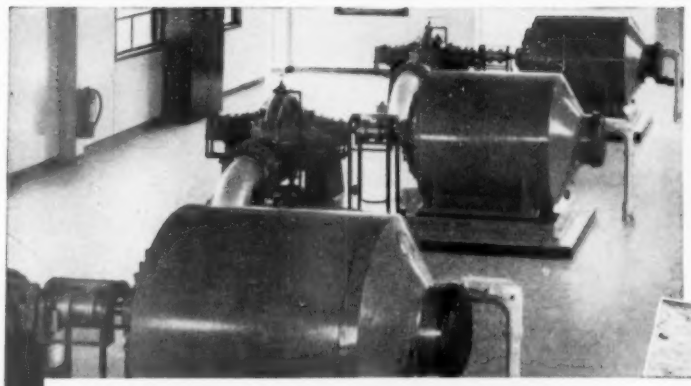
Wagner Electric Corporation EST. 1891

WAGNER ELECTRIC CORPORATION
6389 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS
TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

MH-8



ALLIS-CHALMERS

Underwriters' Laboratories, Inc.
INSPECTED
ELECTRIC MOTOR FOR HAZARDOUS LOCATION
ELEC CLASS I GROUP D AND
CLASS II GROUP F&G NO.

MOTORS

INDOORS or OUT

DIRT and CORROSION

Can't Hurt These Motors

Here is an explosion-proof type of motor that will solve many of your dirt and corrosion problems. Install anywhere, indoors or out.

Cooling System is Self-cleaning

Cooling air is carried through the heat-exchanger tubes with sufficient velocity to expel practically any kind of dirt. If oily or sticky dirt should cling, tubes can be ramrodded clean in a few minutes because tubes are straight and tube ends are exposed.

Choice of Corrosion-resistant Materials

You can lick corrosion with this motor, too. Tubes are available in a variety of materials to meet practically any corrosive atmospheric condition. Allis-Chalmers tube-type motors have long and successful experience in such difficult applications as caustic plants, refineries and petrochemical plants, power plants with fly ash problems and many others.

Next time you need a motor for a dirty or corrosive location or for outdoor operation in all kinds of weather, call your Allis-Chalmers District Office. Get complete information on Allis-Chalmers tube-type totally-enclosed, fan-cooled and explosion-proof motors. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B7149. Available in ratings on frames larger than NEMA 505 up to 3000 hp. (Not all UL approved) A-4223

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Distributors, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE V-belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.

PUMPS — Integral types from ¾ in. to 72 in. discharge and up.

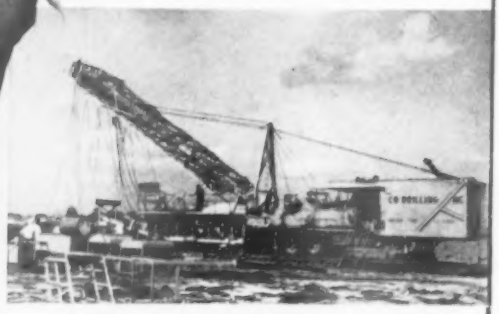
A-C ALLIS-CHALMERS

ALLIS-CHALMERS

PAGES FROM LEBUS ALBUM OF SATISFIED CUSTOMERS

"OUR LEBUS GROOVING SAVED ENOUGH TO PAY FOR ITSELF MANY TIMES . . ." says Joe Beard, Beard Drilling Co.

Owner Joe Beard keeps an eye on the drum as his driller makes a lift on the blocks. Note how evenly the line lays on this drum due to the progressive spooling effect made possible only from LeBus Grooving.



"At first, we snap a line on the drum to raise the mast. This operation takes much less time, by having LeBus Grooving, since we only need a few wraps on the drum."

EXCERPTS OUT OF LETTER TO LEBUS FROM BEARD DRILLING COMPANY . . .

"Last year, I purchased a New Wilson Giant Rig and Wilson 96-foot Mast, and upon your recommendation, I had LeBus Grooving installed on the hoisting drum while the drawworks was still at the factory.

"At first, I wasn't too sure just how this grooving would be on my rig, since I had planned to use this rig primarily for shallow drilling and workover operations. After many months of experience, I find LeBus Grooving a real asset to our operations. The speed with which we are able to tear down, move and rig up is important, especially when working for major companies. We attain a lot of speed, while rigging up, because of the LeBus Grooving. Through this long experience we have also found that only LeBus can offer a true progressive type spooling that will completely eliminate the slipping and cutting-in of wire line, thereby making this type of spooling a real safety factor.

"Our own facts prove to us that the time and money saved, with LeBus Grooving, has paid for the grooving many times in the past ten months.

"The companies for whom we have been operating, compliment us on our speed in setting up and time saved. That is one reason I wanted to write you and say that we feel LeBus Grooving is a real help to us and is one of the big reasons for our receiving these compliments. Thanks for recommending LeBus Grooving to us."

Signed,
Joe Beard,
Beard Drilling Co.

"After the mast is raised, we remove the mast line very quickly and snap on our working line. By having LeBus Grooving, which automatically spools the line correctly, the time required for costly hand spooling is eliminated."

LEBUS INTERNATIONAL ENGINEERS LIMITED

Executive Offices: 305 Wichita Natl. Bank Bldg., WICHITA FALLS, TEXAS
SALES, SERVICE Control and Warehouse Stock LONGVIEW, TEXAS

COMPLETE SALES AND SERVICE LOCATED IN EVERY OIL CENTER

to date ... there are 30!

Here you see a giant absorber tower of special alloy—just one of Graver's expert fabrications at Tuscola, Illinois. Already there are more than 30 Graver-built structures, including both vessels and tankage, that operate as part of this great, new multi-million dollar installation of National Petro-Chemicals Corporation.

These Graver fabrications reflect traditional Graver skill and craftsmanship. Their high quality and guaranteed performance are essential to the successful extraction of chemicals from natural gas ...in this, the largest operation of its kind in the world.

GRAVER TANK & MFG. CO., INC.

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GRAVER

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Partial View of Halliburton's new Pozmix plant in El Paso, Texas

MOST REMARKABLE WELL CEMENT!

POZMIX

Provides These Proved Advantages:

- Greater resistance to sulfate waters
- Low heat of hydration
- More desirable tensile and compressive strength
- Greater resiliency
- Improved water seal
- Savings in overall costs

This exclusive Halliburton blend of pozzolans and portland cement has achieved a dramatic record of success in thousands of wells. It's the most remarkable cement in the history of oil well cementing.

Order Pozmix for a better, money-saving cement on your next job. Phone your local or district Halliburton office. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

CEMENTING SERVICES

THERE'S NO SUBSTITUTE FOR EXPERIENCE IN OIL WELL CEMENTING

VICKERS® *Long Stroke* HYDRAULIC PUMPING

Provides

THESE ADVANTAGES:

- **Fewer Stress Reversals**
- **Lower Range of Stress**
- **Lower Acceleration Forces**
- **Lower Peak Loads**
- **Lower Standing Valve Velocities**
- **Constant Stroke Rate**
- **Greater Sub-Surface Efficiency**

Vickers Model LV-30400-A • 30 ft. stroke 6 strokes per minute • 35,000 lb polished rod load capacity Also available in 20 foot stroke

THESE ADVANTAGES

Result in

- **Lower Maintenance Costs**
- **Less Down Time**
- **Increased Production**
- **Increased Profits**

These Results Are Field Proven . . . they have been Checked ✓ and Double Checked ✓ ✓

Write for NEW VICKERS BULLETIN No. 52-51

VICKERS Incorporated
Division of the Sperry Corporation
Petroleum Equipment Department
2160 EAST IMPERIAL HIGHWAY • EL SEGUNDO, CALIF.
Engineers and Builders of Oil Hydraulic Equipment Since 1921

6043

Money-Savers

Only Midwest "Long-Tangent" Elbows have these longer tangents (dotted lines indicate their length beyond ends of ASA Elbows). Tangents are ¼ of nominal diameter: a 12" elbow has tangents 3" long.

This young man's dad also saves money. But he does it by specifying Midwest LONG-TANGENT Elbows whenever he needs welded piping. These elbows (see above) can be lined up with pipe more quickly and accurately. Less pipe is required and a short nipple (with its extra circumferential weld) is frequently eliminated. Slip-on welding flanges are easily used with minimum change in either flange or fitting. And then . . . Midwest "Long-Tangent" Elbows cost no more than ASA Elbows. You, too, can save money by specifying them on your next welding fittings order.

MIDWEST PIPING COMPANY, INC.

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Sales Offices:

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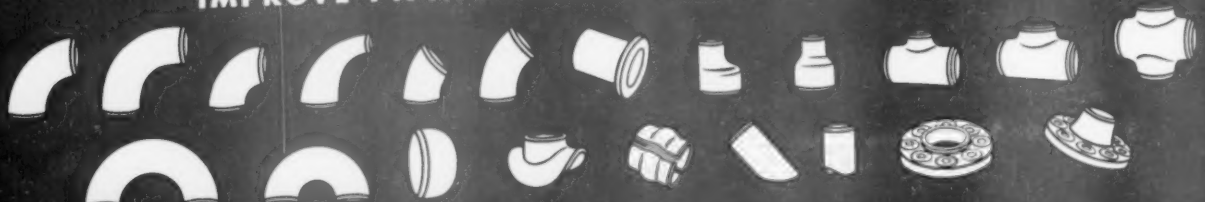
IMPROVE PIPING DESIGN AND REDUCE COSTS



CHEMICALS

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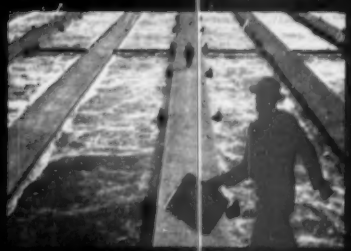


WATER AND SEWAGE

Take a trip with a MATHIESON *Technical Service Man*

This man, typical of the Mathieson Technical Service Staff, is experienced on an industry-wide basis in the handling and use of industrial chemicals. Every day, as a trip with a Mathieson Technical Service Man would show, brings up new problems on which his broad experience is invaluable. For example:

A paper mill in New England is visited and advised on super-bleaching with chlorine dioxide. A soap manufacturer in the Middle West wishes to discuss the advantages of low-iron caustic. A chemical plant in the East is counseled on the storage and handling of sulphuric acid. Several Southern textile mills are visited in connection with the storage of soda ash. A gray-iron foundry in Ohio is advised on controlling sulphur with Purite. A glass plant in the Southeast wants information on soda ash and nitrate of soda. A petroleum refinery in the Southwest seeks assistance on the handling of caustic soda, and several water works are advised on taste and odor control with chlorine dioxide.

And so it goes. More and more, industry is looking to Mathieson Technical Service for practical assistance on the handling and use of basic chemical raw materials. A call to your Mathieson representative is all that's needed to avail yourself of this industry-wide experience.

MATHIESON

MATHIESON CHEMICAL CORPORATION
Mathieson Industrial Chemicals Division
Baltimore 3, Maryland

2022

caustic soda • soda ash • chlorine • sulphur • bicarbonate of soda
dry ice and carbonic gas • ammonia • sodium nitrate • nitric acid
hydrazine products • sodium methylate • sodium chlorite • hypochlorite
products • sulphuric acid • ethylene glycols and oxide • methanol

Do you have this MARVEL Inverse Oiler on your { GASOLINE / BUTANE / or / DRY GAS } engine?

then you should use this MARVEL MYSTERY OIL in the Oiler!

Here's a carefully engineered pair to improve performance of any engine . . .

The *Marvel Inverse Oiler* is designed to feed *Marvel Mystery Oil* in exact proportion to engine speed and load. Prevents excess wear on valve stems and guides . . . keeps upper piston rings free to move in their grooves . . . retards ring flutter . . . and cushions ring pounding which can result in ring breakage. In addition, *Marvel Mystery Oil* reduces cylinder wall wear, and gives assurance against valves sticking. Remember, it is *the oil* which must do these things and only *Marvel Mystery Oil* is blended for this purpose and for this oiler. Over 30 years of exceptional performance.

This Chart shows the proper setting for constant load engines

BRAKE H. P. AT BELT	NAT. GAS CU. FT. PER HOUR	BUTANE GALLONS PER HOUR	GASOLINE GALLONS PER HOUR	M. M. OIL DROPS PER MIN.	M. M. OIL HOURS PER QUART
10	115.	1.07	1.12	4	228
15	172.5	1.60	1.68	6	152
20	230.	2.14	2.24	8	114
25	287.5	2.67	2.80	10	91
30	345.	3.21	3.36	12	76
35	402.5	3.74	3.92	14	65
40	460.	4.28	4.48	16	57
45	517.5	4.81	5.04	18	50
50	575.	5.35	5.60	20	45
60	690.	6.42	6.72	24	38
70	805.	7.49	7.84	28	32
80	920.	8.56	8.96	32	28
90	1035.	9.63	10.08	36	25
100	1150.	10.70	11.20	40	22
120	1380.	12.84	13.44	48	19
140	1610.	14.98	15.68	56	17
160	1840.	17.12	17.92	64	14
180	2070.	19.26	20.16	72	12
200	2300.	21.40	22.40	80	11
225	2587.5	24.00	25.20	90	10
250	2875.	26.75	28.00	100	9
275	3162.5	29.42	31.10	110	8
300	3450.	32.10	33.60	120	7

EXAMPLE:—If you use 805 cu. ft. of dry gas, 7.49 gallons of butane or 7.84 gallons of gasoline, your H.P. is about 70, so adjust oiler to feed 28 drops per minute. You will then receive about 32 hours per quart of MARVEL MYSTERY OIL.

If engine load increases after setting for normal load, oiler will automatically increase its feed, or decrease its feed when load is lessened.

When more than one oiler is used

To determine drop count per oiler when more than one oiler is used on an engine—divide recommended drop count by number of oilers.

NOTE: Guarantee on oiler is void if any other oil than MARVEL MYSTERY OIL is used therein. Some *engines* also carry this guarantee policy.

See Your Local Jobber or Oil Well Supply House

EMEROL MFG. CO. Dept. 373, 242 West 69th Street, New York 23, N. Y.

LUFKIN'S Latest

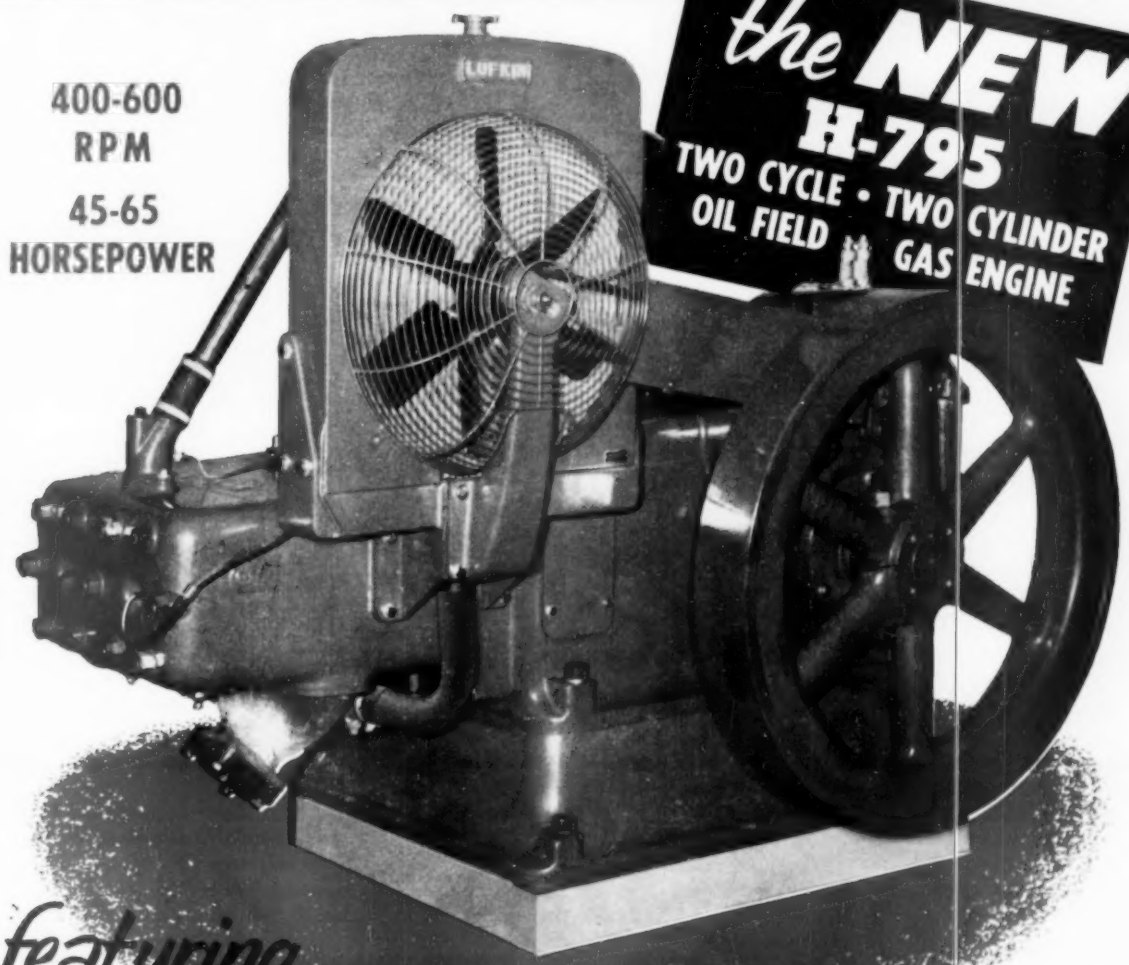
CONTRIBUTION TO THE ECONOMICAL AND TROUBLE-FREE PRODUCTION OF OIL

400-600 RPM

45-65 HORSEPOWER

the **NEW H-795**

TWO CYCLE • TWO CYLINDER OIL FIELD GAS ENGINE



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THE MOST IMPORTANT

CASE HISTORY *is your own!*

In nearly a half century of dehydrating effort, the Tretolite Company has compiled thousands of successful case histories. While such case histories provide an impressive record of successful Tretolite applications, they also have shown that very few demulsifying problems are similar. Chemical formulas, methods of application, and dehydrating results, vary from state to state, field to field, and frequently, lease to lease. One important fact that the Tretolite Company has learned, is that virtually every dehydrating problem must be considered as an individual case.

That is why the Tretolite Company insists on having field engineers in every oil production area. They are there to get you the chemical formula and method of application which will be most effective for *your problem*. The Tretolite Company believes that the "case history" which is of greatest interest to *you*, is the one written on *your* lease. *After all, that's the one that solves your problem and saves your money.*

On your next dehydrating problem, call in your Tretolite field service engineer. He's an expert at producing *successful* case histories.

TRETOLITE COMPANY

A Division of the Petrolite Corp.

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Chemicals and Services for the Petroleum Industry

DEHYDRATING • DESALTING • CORROSION INHIBITING

SCALE PREVENTING • PARAFFIN REMOVING • WATER DE-OILING

Eliminate drilling! Finish boring's the first step with TIMKEN® seamless steel tubing!

DRILLING'S a thing of the past when you use Timken® seamless steel tubing. The hole's already there! You save time and money by starting with finish boring.

Screw machine stations are available for other jobs. The result: You add machine capacity without adding machines.

Timken seamless steel tubing saves you additional money because you don't waste steel. All you pay for is the steel you use. We give you the holes.

To make sure you get the most steel per dollar, our engineers will be glad to study your problem and recommend the most economical tube size for your hollow parts jobs.

Timken seamless steel tubing gives you high internal quality because the piercing process by which it's made is basically a forging process. It has a uniform spiral grain flow for greater strength, and a refined grain structure which brings out the best in the quality of the metal. And our rigid quality control makes sure that the quality is uniform from tube to tube and heat to heat. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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Beta Ray H/c Meter

utilizes radioisotopes

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FOR INDUSTRIAL LABORATORY USE

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FOR RESEARCH

Now . . . for the first time . . . a practical, dependable, and accurate instrument is available for quick determination of the hydrogen content of liquid hydrocarbons. The new Cenco Beta Ray H/C Meter provides an easy and fast means of obtaining this information. With this revolutionary apparatus, hydrogen determinations can be made by a laboratory technician in five minutes with an accuracy of 0.02 weight percent hydrogen.

The customary organic combustion train method requires 4 hours per determination, and a skilled laboratory technician and produces results having an accuracy of 0.05 weight percent hydrogen.

The measurement of hydrogen in a hydrocarbon is of extreme importance in petroleum processing today. In many refining operations the hydrogen-carbon ratio is altered. The percentage of hydrogen is an index to the performance of end products, as fuel oils, jet fuels, gasolines, etc. With a Cenco Beta Ray H/C Meter, accurate measurement is made wherever needed . . . in product analysis . . . or in the research laboratory. Guesswork is eliminated. Delays are avoided.

Based on beta ray absorption.

This new instrument makes use of the absorption of beta rays obtained from the radioactive decay of strontium 90. Hydrogen contains approximately twice as many electrons per unit weight as other elements, and absorbs beta rays more efficiently on a weight basis. This basic principle makes possible the rapid and precise determination of hydrogen.

Our 14 branch offices and warehouses assure prompt service and shipment.

The Cenco Beta Ray H/C Meter is manufactured by Central Scientific Company under license by Standard Oil Company (Indiana).

HOW IT OPERATES

To make the hydrogen test, a sample of the liquid hydrocarbon is poured into a cell within the apparatus. The beta ray source is made to radiate equally in two directions, each going to a separate detector. One passes through a fixed absorber, and the other through an absorber that can be moved and also through the sample.

The movable absorber is shifted until a galvanometer shows equal currents are being produced by the two radiations. Then, by reading the position of the absorber the necessary data is quickly obtained.

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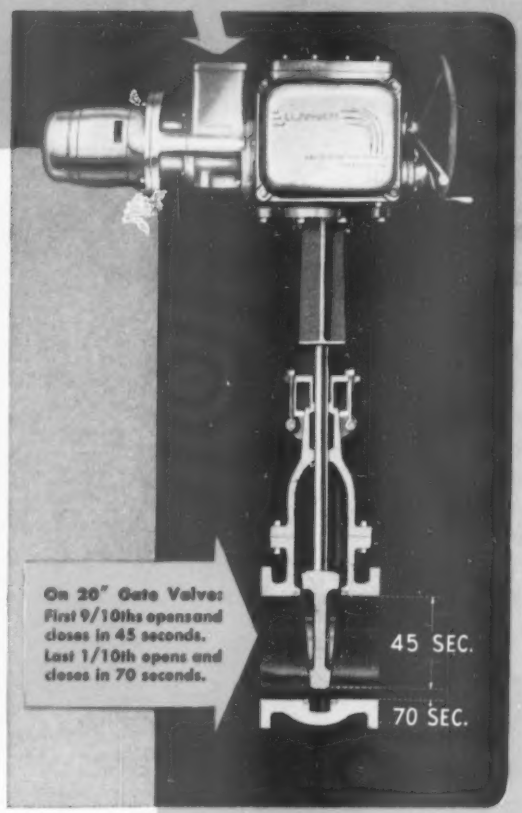
HI-LO LIMITORQUE.

2 SPEED AUTOMATIC VALVE OPERATOR



..helps to prevent SURGE or HAMMER during closure of valves..

The name *Limitorque* has been for years synonymous with dependable MOTORIZED VALVE OPERATION in Refineries, Pipe Lines, Power Plants, Water and Sewage Works . . . throughout the World.

Now, a device is available for use with *Limitorque* which permits a valve to be *operated at 2 different speeds*. This device, known as the "HI-LO" attachment permits the speed of the valve stem to be VARIED AT ANY PRE-DETERMINED POINT . . . or if required, the valve may be opened at one fixed speed and closed at another pre-determined speed.

"HI-LO" is a device which prevents:

- DAMAGE to valves and station pumps.
- BREAKS in pipeline caused by "surge".
- DAMAGE to expensive equipment.
- INJURIES to personnel.

"HI-LO" is a device which minimizes or completely eliminates:

- LINE "SURGE" OR "HAMMER" during closure.
- NECESSITY OF BY-PASS VALVES because of greatly increased torque during initial valve opening.
- ELEMENT OF HUMAN ERROR, to a great extent, in operation.

The 2-Speed "HI-LO" is new, different, exclusive, and when combined with *Limitorque*, gives simple, positive, automatic and safe motorized valve operation.

Above illustration shows a 20" Gate Valve with first 9/10ths of travel closed in 45 seconds—and last 1/10th of travel to close in 70 seconds. However, change from high to low speed can be made at any pre-determined point of travel. Operation can also be fixed to obtain one speed closing, and one speed (either faster or slower) in opening of valve.

Philadelphia Gear Works, INC.

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Industrial Gears and Speed Reducers
LimiTorque Valve Controls

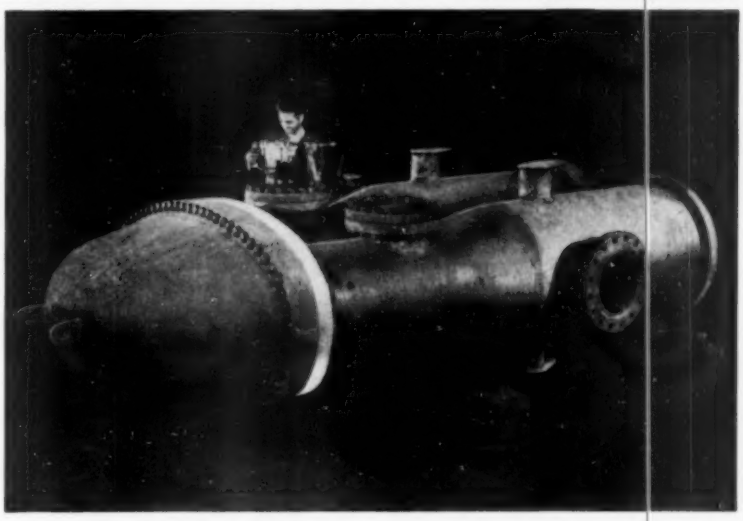
PROCESS EQUIPMENT NEWS

PUBLISHED BY FABRICATED PRODUCTS DIVISION, THE W. M. KELLOGG COMPANY JANUARY 1954

Unique Bundle Puller Makes Gains Abroad

Kellogg's Hydro-Ejector, a special device for hydraulically removing and retracting tube bundles, is now standard equipment in many refineries. The use in the United States has generated considerable interest abroad, and independents as well as U. S. affiliates are using this portable unit to speed maintenance work.

Experience has proved that two men can handle even the largest bundles, taking less than 25 minutes to perform the operation of ejecting or retracting any size unit a distance of eight feet. The Hydro-Ejector can exert a force of 12,000 pounds, sufficient to overcome dirt formations that cause many bundles to stick.



Special High-Temperature Exchangers for Gasoline-from-Coal Synthesis

Illustrated is one of ten unique heat exchangers especially designed and fabricated by Kellogg for use in a gasoline-from-coal synthesis plant under construction in South Africa. This exchanger is being made ready for hydrostatic testing.

When in service the units will perform a highly critical function in the pre-heating of gas in a catalytic reforming unit. Each capable of operating under temperatures of 1625°F and pressures of 365 psi, the exchangers are being fabricated in Kellogg's shops rather than overseas because of Kellogg's extensive engineering and fabrication experience in production of alloy equipment for handling critically high temperatures and pressures.

Tubes and tube sheets of the exchangers are fabricated of Type 310 stainless steel. The shells are internally insulated.

In the reforming unit, residual hydrocarbons in synthesis gas, produced in the coal gasification plant, and recycle gas from the synthesis section are converted to additional synthesis gas.

High-Pressure Units Scheduled for Chemical Plant

Four special high-pressure exchangers for a major chemical processor are now being designed in Kellogg's heat transfer division.

They are of the integral tube sheet-channel type because of the operating pressures which will be in the neighborhood of 1000 psi on the tube side. Each will contain a U-tube bundle consisting of 32-foot long copper tubes.

For further information, details of methods, etc. contact

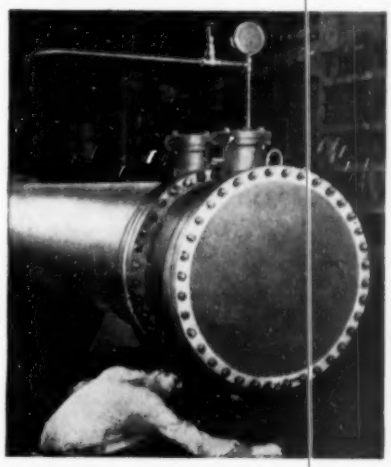
FABRICATED PRODUCTS DIVISION
THE
M. W. KELLOGG
COMPANY
225 Broadway, New York 7, N. Y.
or offices in Jersey City, Buffalo, Los Angeles, Tulsa, Houston, Toronto, London & Paris

KELLOGG PULLMAN

Reflux Exchanger for Combination Unit

This reflux-crude exchanger is one of many exchangers, coolers and condensers recently completed in the shops for a combination refinery in Brazil. Here it is shown undergoing hydrostatic testing.

The unit is 35" inside diameter, of steel construction throughout, using $\frac{3}{4}$"OD tubes on square spacing. When installed the unit will preheat crude against reflux gas oil raising its temperature from 60° to 280°F.



Once it gets a foothold, fire rips into your plant like a monstrous claw. That means you must guard every hazard– flammable liquids, electrical equipment as well as ordinary combustibles– with Kidde Portable Extinguishers or Built-in Systems. Call your Kidde agent today.

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Tubing Problems?

Put our "experience file" to work on them

● Our "experience file" is made up of case histories dealing with practically every condition or combination of conditions that might cause premature pipe or tubing failure. These case histories are the result of 60 years of working on tubing problems that may be new to you today, but that we've faced in the past and solved.

The fruits of these years of research are yours for the asking. National Tube is able to offer you seamless tubing, condenser tubes, heat exchanger tubes, and refinery piping in a selected group of *24 different analyses*. Each of these 24 different analyses has been performance-proved to meet the specific requirements of corrosion and oxidation for which it is recommended. Other chemical compositions are also available in tubular products and a wide variety of high temperature problems are under study.

Check over the list of analyses shown here. Then, before you decide on new piping or tubing, consult with our engineers. Make certain that you get the exact analysis that will best insure top efficiency and the most economical performance.

National Tube Division is your headquarters for up-to-the-minute steel tubing information. Write us anytime. Address: National Tube Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

Here are our 24 different steel tubing analyses:

Carbon	2¼ Cr, 1 Mo	7 Cr, ½ Mo	27 Cr
Carbon, ½ Mo	2½ Cr, ½ Mo, ¾ Si	8 Cr, ½ Mo	18-8
½ Cr, ½ Mo	3 Cr, 1 Mo	8 Cr, 1 Mo	18-8 Ti
1 Cr, ½ Mo	5 Cr, ½ Mo	9 Cr, 1 Mo	18-8 Cb
1¼ Cr, ½ Mo	5 Cr, ½ Mo, 1½ Si	12 Cr, Al	18-8 Mo
2 Cr, ½ Mo	5 Cr, ½ Mo, Ti	17 Cr	25-20

All National Seamless Tubes are pierced from a solid billet of high-quality steel. This is the one manufacturing method that removes all doubt concerning uniform wall strength.

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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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U·S·S NATIONAL SEAMLESS PIPE AND TUBES

UNITED STATES STEEL

Carter

—LONG-STROKE HYDRAULIC PUMPING UNITS—

- *Designed-*
- *Built-*
- *Priced-*

FOR STRIPPER WELLS

featuring the LONG, LOW UPSTROKE and VARIABLE CYCLE which provide increased production – reduced Sanding Up – greater overall efficiency – longer life and low maintenance costs!

Increased production — both immediate and ultimate.

Sanding up eliminated, or greatly reduced.

Gas lock eliminated.

Higher volumetric efficiency in working barrel.

Maximum production without pumping off or pounding fluid.

Less wear and failure of all parts, such as rods, tubing, pumps, balls, seats.

Qualified representatives for sales and service are located at convenient points throughout the oil country.

Easily maintained by regular field personnel, because of extreme simplicity and practicability of design and construction.

No concrete foundation is usually necessary.

Quick and easy set-up. Some machines are being used as portable test units.

The present perfected models have been in use by both majors and independents for more than seven years.

Low first cost. Prices competitive with conventional mechanical equipment.

Prompt delivery at present.

MORE THAN 700 UNITS NOW IN SERVICE!

MORE THAN SEVEN YEARS OF FIELD EXPERIENCE!

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Tool Pushers, Contractors, Derrick Men and Rough Necks told us the problems they have run across most often! From field studies, based upon years of contact with drilling operations, Union Wire Rope engineers have compiled information which bears directly upon ways and means of getting more service from wire rope.

This has been published in 4 different Rope Dope educational bulletins which will be sent periodically and without charge to those in the drilling industry who send their names and addresses to be placed upon our Rope Dope mailing list.

It will be worth your time to fill in the coupon at the bottom of the page! You may find new ideas that help you get longer service than ever from your wire rope . . . information that pays off in lower operating costs, more efficient operation! Write today for these four important additions to the Union Wire library of educational bulletins!

VOL. 4—NO. 1D

Important Facts About Line Wear!

Tells you why and where line wear most often occurs, what to do to beat it! Has a suggested ton-mile cut off procedure and a Tuffy Tips section on correct care and maintenance for improved service!

VOL. 4—NO. 2D

Helpful Ideas About Rotary Drilling!

Explains why rotary drilling is so tough on rope, has easy-to-read table with simple formulas for checking against overloading! Tuffy Tips section shows efficiency of wire rope over sheaves in graph form!

VOL. 4—NO. 3D

The Right Rope For Different Areas!

An outline of wire rope used in well drilling—useful as a guide to types or constructions best suited to various fields! Tuffy Tips section tells when, why and how to lubricate!

VOL. 4—NO. 4D

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Contains guide tables of different constructions, plus reasons why one construction is better for certain jobs than another! Tips section shows easy way to set up reels for rewinding . . . things to keep in mind when storing and handling!

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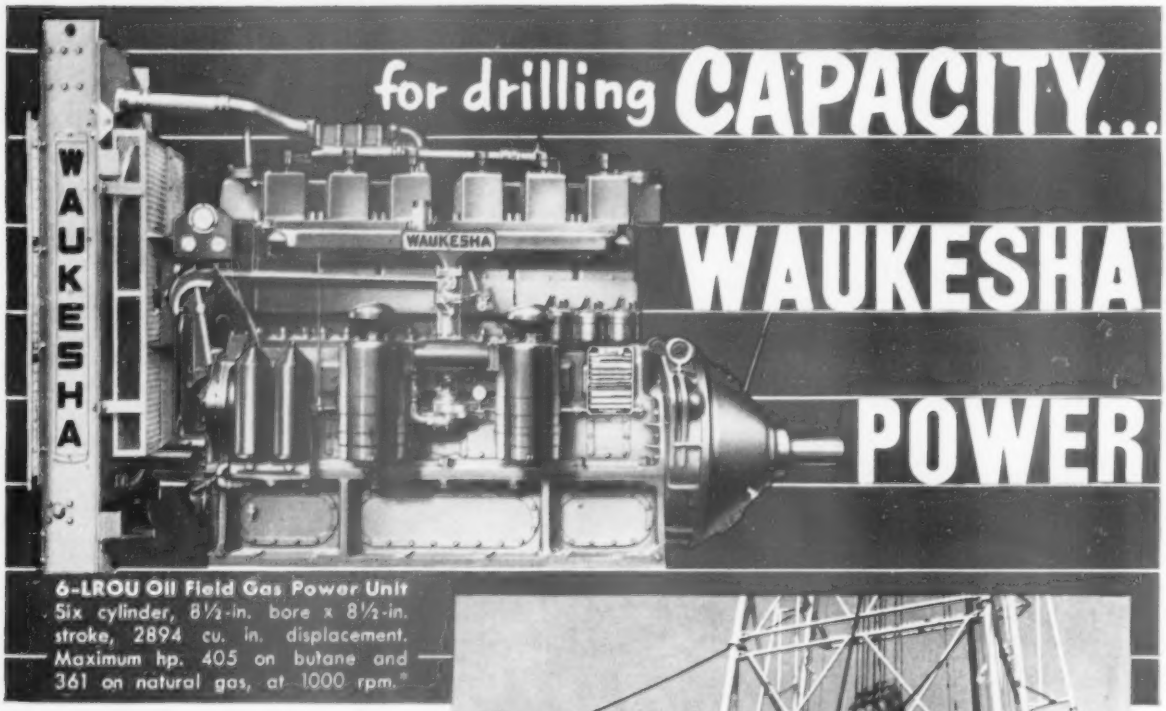

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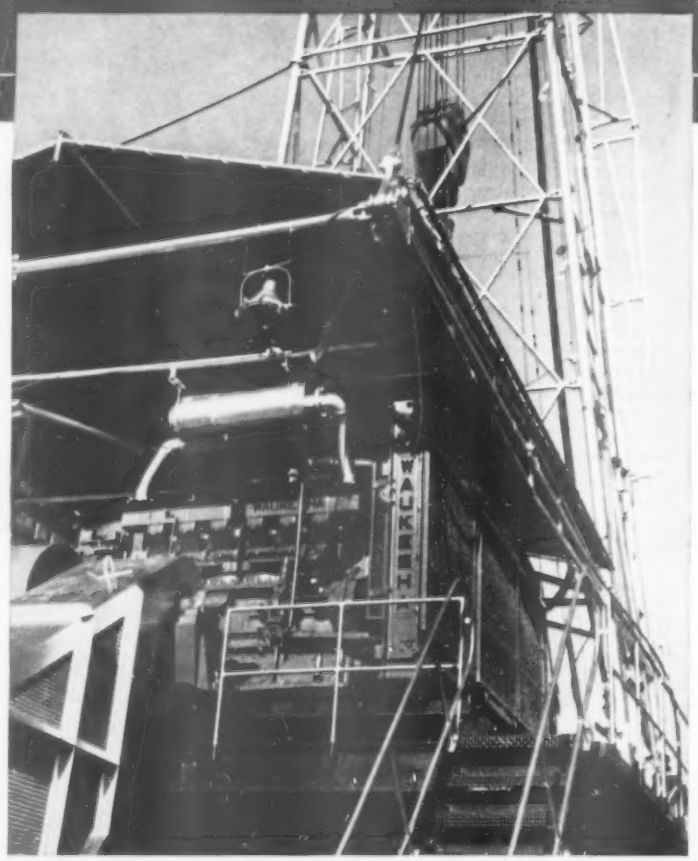
6-LROU Oil Field Gas Power Unit
Six cylinder, 8½-in. bore x 8½-in. stroke, 2894 cu. in. displacement. Maximum hp. 405 on butane and 361 on natural gas, at 1000 rpm.*



*OTHER MODELS—for gas, normal Diesel, or turbo-charged Diesel operation —to 570 horsepower.

● Look at the rig's power plant. There's your proof of production. The capacity is there . . . the speed is there . . . the flexibility is there—with Waukesha Giant Sixes! Oil field favorites for over 20 years!

Each is a complete, independent power plant. With a radiator cooling system, self-contained lubricating system, heavy-duty clutch and power take-off. Or compounded for super power! High compression overhead valve, 6-cylinder, 2894 cu. in. gas engine—vertical design with box base, separate crankcase and separately mounted three-bore cylinder blocks. Renowned for reliability!

New *Oilwell* 76 rig shown has 3 Waukesha Giant Sixes. Bulletin 1560 tells *why*.

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS.
NEW YORK TULSA LOS ANGELES

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WAUKESHA

Diesel OIL FIELD POWER *Gas*

BENDS LIKE THIS

CAN CUT YOUR TUBING COSTS

It takes uniformly ductile tubing . . . easily workable . . . to make these hairpin bends. Uniform wall thickness is important, too. And so are uniform diameter, uniform concentricity and uniform strength.

You'll find all these features . . . and more . . . in Republic ELECTRUNITE Pressure Tubing. ELECTRUNITE Tubing has no hidden defects. It's made from flat-rolled steel that's inspected on both sides *before* the tubing is formed. Result: tubing that's free from scale, scabs and slivers . . . has a fine surface that helps resist corrosion . . . has no longitudinal thin spots.

Whether you're interested in re-tubing . . . or new equipment . . . it will pay you to specify ELECTRUNITE Pressure Tubes. Available in both carbon and various stainless analyses. Write for booklet CEC-53 for complete information.

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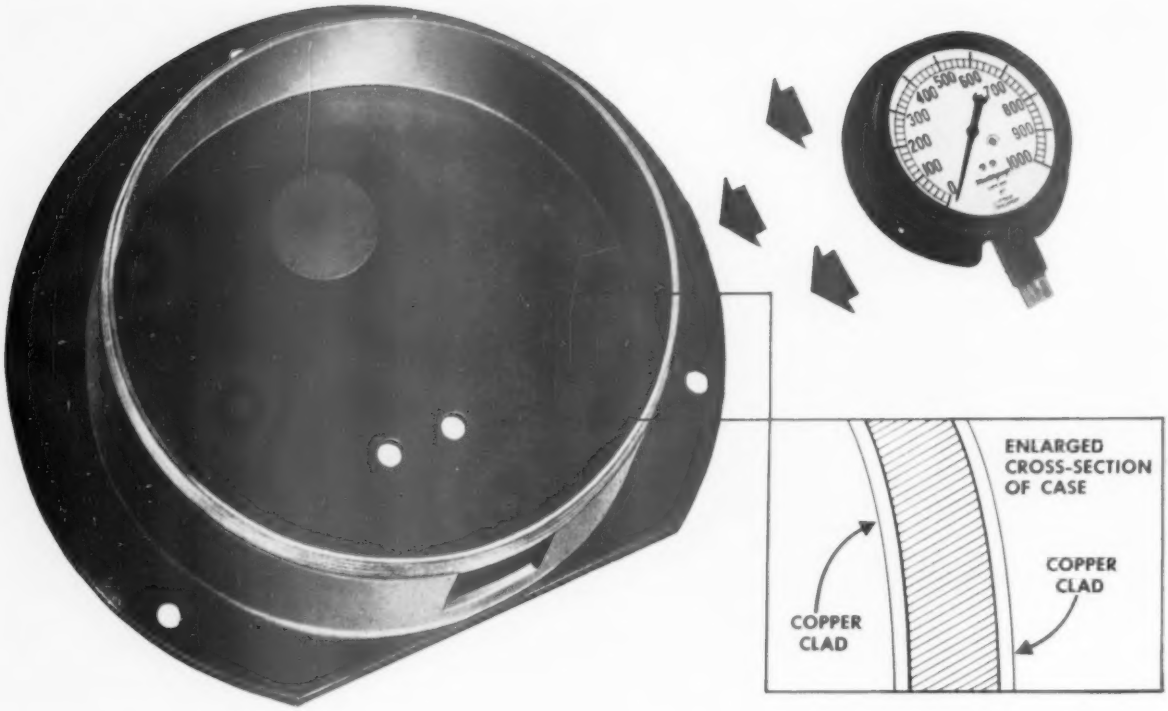

A CASE TO MATCH "Mastergauge" QUALITY

Few products have ever achieved the leadership that has been conceded to the Marsh "Mastergauge." But instead of allowing the "Mastergauge" to coast on its laurels we have kept right on making it better. An example of this is the

NEW "Marshalloy" CASE

The recently developed case is accurately formed in steel of boiler plate thickness; then heavily copper-clad so that it has the corrosion resistance of a solid copper case with the strength of steel.

Such a case is four times as strong and one-third lighter than conventional cast iron cases. It is finished in a newly developed, corrosion-resistant satin-black enamel that makes it as attractive as it is durable.

The new case is fitted with Marsh safety blow-out plug — another typical Marsh advancement. Ask for information covering gauges for all services.

SOCKET, TUBE AND END-PIECE FUSED INTO ONE UNIT

Just as welded piping is more sound than any mechanical joining, the fusing of the socket, tube and end-piece into an integral unit is the most dependable pressure gauge construction ever known.

Welding these dissimilar parts together is a tricky problem — fully solved by a special process which produces

THE "Conoweld" TUBE

The photo of an actual section through the socket shows the perfect fusion. Instrument men have called this the most significant pressure gauge development in recent years.

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MARSH INSTRUMENT CO. *Sales affiliate of Jas. P. Marsh Corporation*
Dept. L, Skokie, Ill. *Export Dept., 3501 Howard St., Skokie, Ill.*

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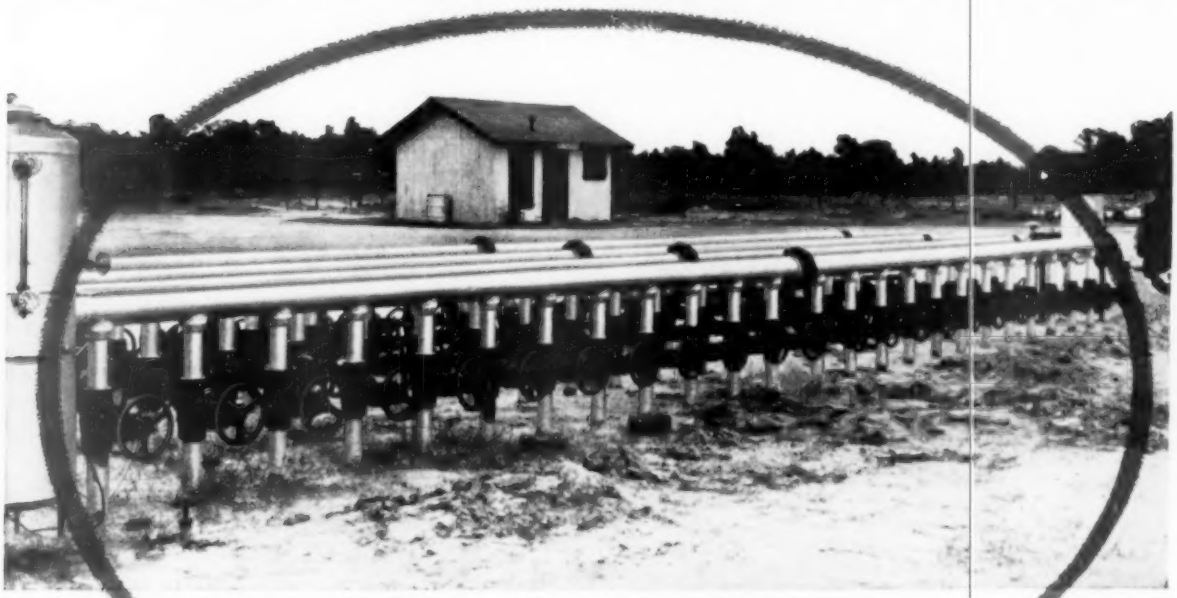
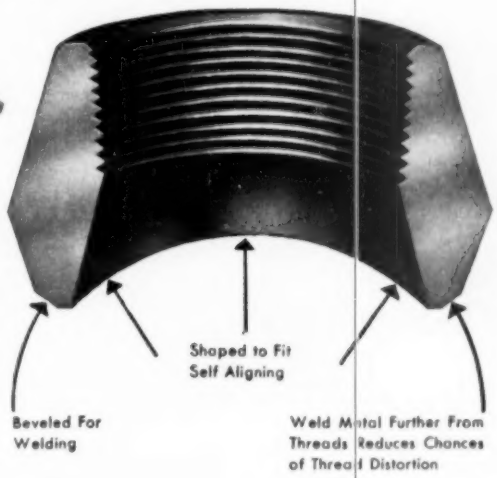
BOOST YOUR PRODUCTION with THREDOLETS and SOCKET WELDOLETS!



ThredOlets at work in L. P. Gas Plant Production Separators. 4" x 2" ThredOlets utilized for branch connections on manifolds subjected to contraction, expansion and vibration. The ThredOlet's short height and wide footing creates rugged branch construction.



Insure production economy in pipe fabrication through the *exclusive* features *engineered* and *manufactured into* ThredOlets and Socket WeldOlets. Production is boosted because you weld *more pieces* per hour!

Instant application and immediate availability will save you time, labor and money in constructing all 90° Threaded and Socket-weld branch connections.

SPECIFY AND USE...
BONNEY THREDOLETS & SOCKET WELDOLETS

FOR COMPLETE ENGINEERING DATA WRITE FOR YOUR BONNEY W-3 WELDOLET CATALOG
DISTRIBUTORS IN PRINCIPAL CITIES

ThredOlets

Socket WeldOlets

WELDING FITTINGS DIVISION
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ALLENTOWN, PENNSYLVANIA

G-R fin-fan ...

from every point of view...

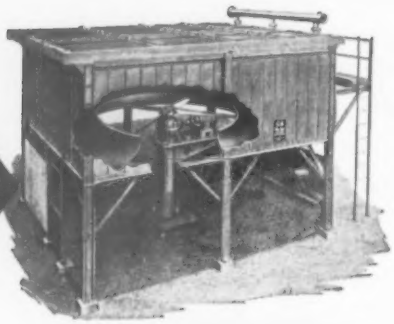
top value in **Air-Cooled Heat Exchangers**

G-R **fin-fan** is top value in air-cooled heat exchangers because of the *experience* behind this unit. This experience includes 85 years of building heat transfer apparatus, 25 years of specializing on extended heat transfer surfaces as used in air-cooled exchangers, the operating records of hundreds of **fin-fan** installations all over the world, and the results of thorough tests on every element of the unit.

FROM ABOVE

The K-Fin Sections which form the heat transfer surface are used only in the G-R **fin-fan**. Many millions of square feet of this exclusive helically-finned surface are being used in more types of air-cooled services than any other design.

FROM THE SIDE



The strong reinforced construction is built to withstand wind pressures of more than 40 lbs. per sq. ft. The pre-fabricated, pre-drilled structure is specifically designed for speed and convenience of erection and connection to additional units.

FROM BELOW

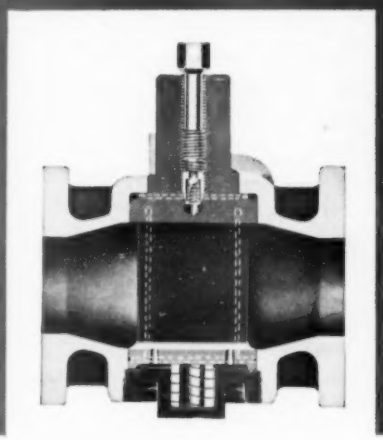
Drive mechanism for G-R **fin-fan**. Note the mounting of driving motor and gear reducer, the powerful fan of proven performance, and the smooth bell ring for maximum aerodynamic efficiency.

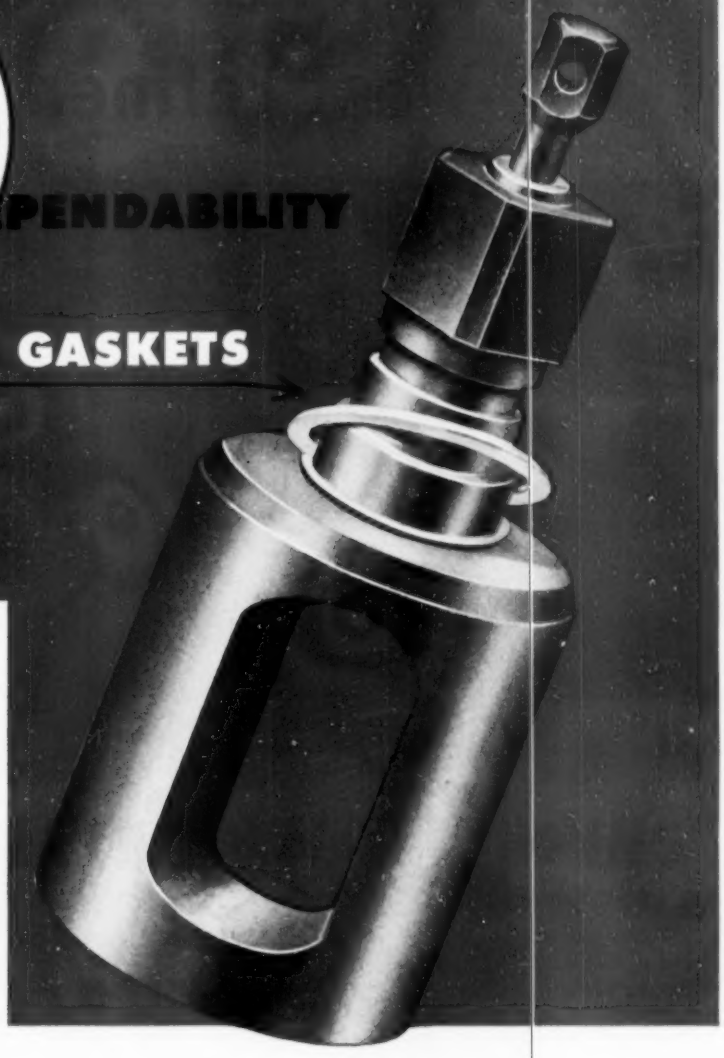
THE GRISCOM-RUSSELL CO., MASSILLON, OHIO

GR334A

NEW DEPENDABILITY

WITH TEFLON GASKETS





Gasket characteristics:

- **self lubricating**
- **can't bind**
- **unique shape maintains lubricant release**
- **pressure tight**

Round Port Valves—100% Obstruction Free • Rectangular Port Valves with Full Pipe Area • Venturi Valves for Economy

Now standard on a.c.f. Lubricated Plug Valves, this exclusive a.c.f. development gives protection against head leakage at high pressure and at temperatures up to 450° F. Greatly reduces turning torque. Increases service life without materially affecting price.

Four years of field service tests under most exacting conditions have confirmed the effectiveness of this new discovery. Get all the facts from your nearby a.c.f. valve representative.

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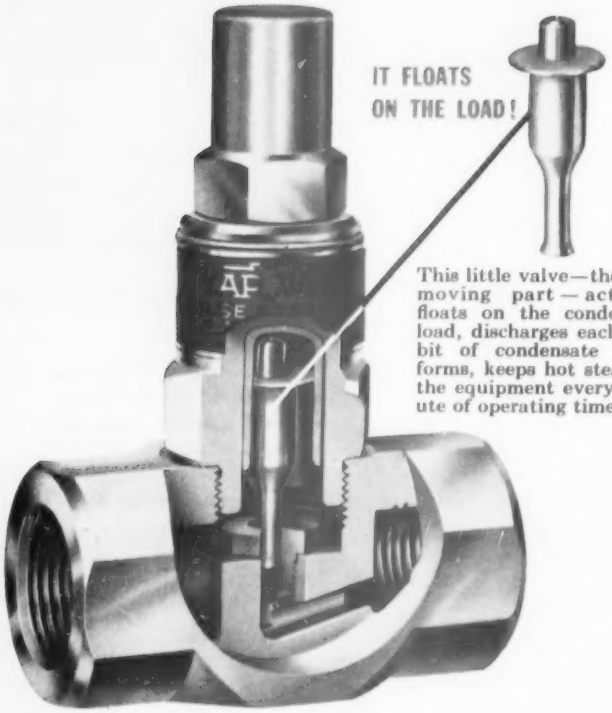
Representatives in 50 Principal Cities

CYLINDRICAL FULL PIPE AREA

PLUG VALVES

Write for Catalog No. 4-OG and Price List. American Car and Foundry Company, Valve Division, 1501 E. Ferry Avenue, Detroit 11, Michigan

3000 impulses help keep mid-west refinery "on stream"



This little valve—the only moving part—actually floats on the condensate load, discharges each tiny bit of condensate as it forms, keeps hot steam in the equipment every minute of operating time.

THIS big refinery at Lawrenceville, Ill.—like a lot of other important refineries — uses Yarway Impulse Steam Traps.

Over 3000 Yarway Impulse Traps are installed on tracer lines and for draining steam headers.

Popular features of the Yarway Impulse Steam Trap are its ability to get equipment *hot in a hurry*—and keep it hot! . . . also its small, handy size—fits in easily in any location; its stainless steel body and working parts; quick installation; easy maintenance; low initial cost.

Another advantage—IMMEDIATE DELIVERY from 250 local distributors, plus quick service from nearby Yarway field engineers.

More than 900,000 Yarway Impulse Steam Traps have been sold. For a free Steam Trap Selector, write . . .

YARNALL-WARING COMPANY
136 Mermaid Ave., Philadelphia 18, Pa.

YARWAY® impulse® steam trap

YOUR ANSWER TO FLEXIBLE TUBING PROBLEMS

PENFLEX "FLEXINEERING"

THE CORRECT TUBING . . . PLUS TECHNICAL AID ON EVERY JOB

is the *know-how* of the Penflex Engineer plus the *can-do* of Penflex Flexible Metallic Tubing serving you from design board right up to job installation and maintenance. It is the scientific application of the right type of steel, bronze, or aluminum flexible tubing to your air, oil, water, gas, steam, volatiles, or light solids conduction requirements. It is the specific recommendation of the right size and weight flexible tubing—four-wall interlocked or seamless welded corrugated type—in sizes from 1/8" to 24" I.D. And it is the nation-wide supply of Penflex in any quantity where you want it, when you want it.

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on the complete Penflex line of Flexible Tubing, Hose, Couplings

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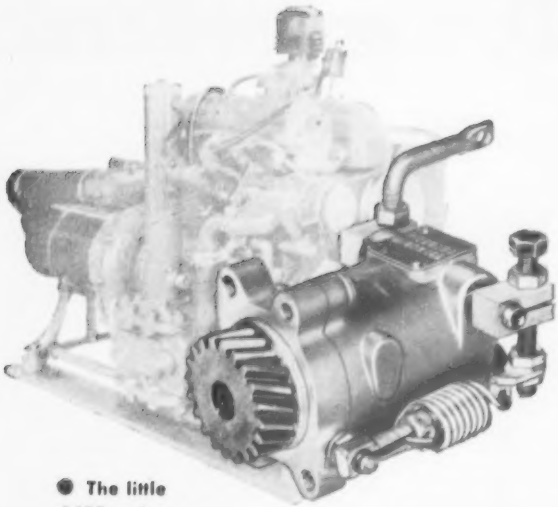
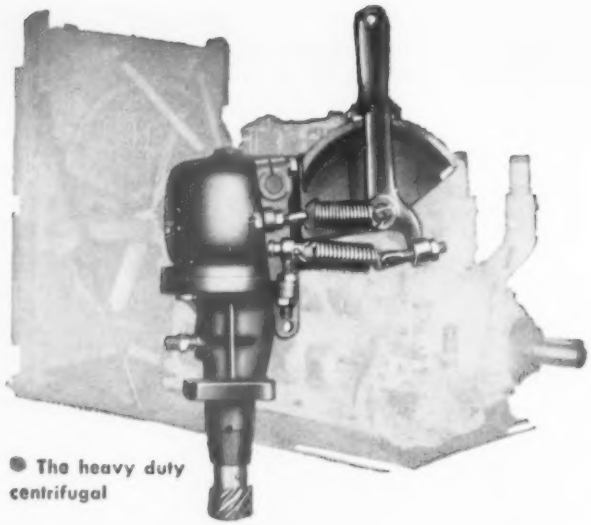


● The little 1400 series



● The heavy duty centrifugal

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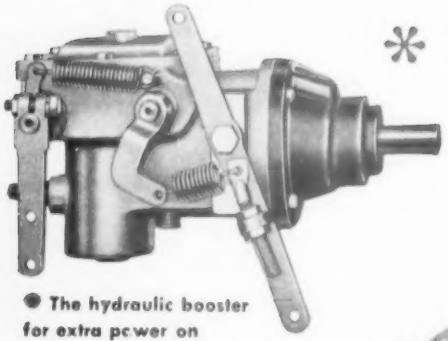
preferred for gas (LPG), gasoline and diesel industrial engines... big, medium and small

● The standard long range 900 series



● The hydraulic booster for extra power on racks and valves

Pierce centrifugal governors are your most economical and efficient control mechanisms for industrial engines . . . from small generator sets to monster power units . . . gas (LPG), gasoline or diesel. For engines requiring extra power to position fuel rack or valve, the Pierce centrifugal with hydraulic booster * (for original equipment only) is ideal! Service is locally available . . . your nearby Pierce Service Station is equipped for all types of Pierce Governors.

Specify PIERCE Centrifugal governors on your engines . . . for economical, thoroughly dependable control in industrial applications.

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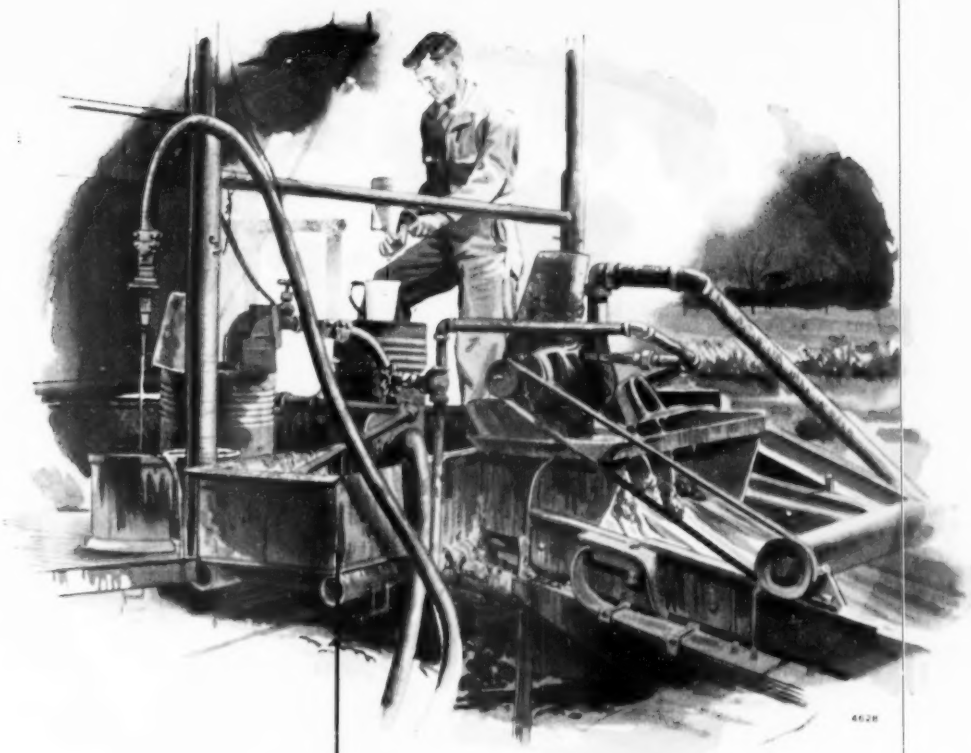

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Baroid products available at over 600 distribution points, throughout every active drilling area.

The most effective mud programs consider the formations to be drilled from spudding to completion, the equipment to be used, the amount of money to be spent, and the results that are to be achieved.

More than a quarter-century of Baroid research and experience provides your Baroid field man with the necessary information to help you plan your mud program . . . *before the well is spudded in* . . . and to solve mud problems while drilling. Baroid's complete line of field proved mud products, developed during years of drilling progress, are always available, everywhere, and are being continually improved to solve new problems.

Baroid field service engineers are available to assist you in your mud program planning. Use their services regularly for mud control that provides faster, safer, more economical drilling.

Baroid engineers have compiled a series of trouble shooting charts to help you solve your drilling mud problems. The charts can not prescribe a trouble-free mud for all conditions. They DO provide suggestions on specific mud problems encountered during the various phases of drilling your well. Write for your copy now.

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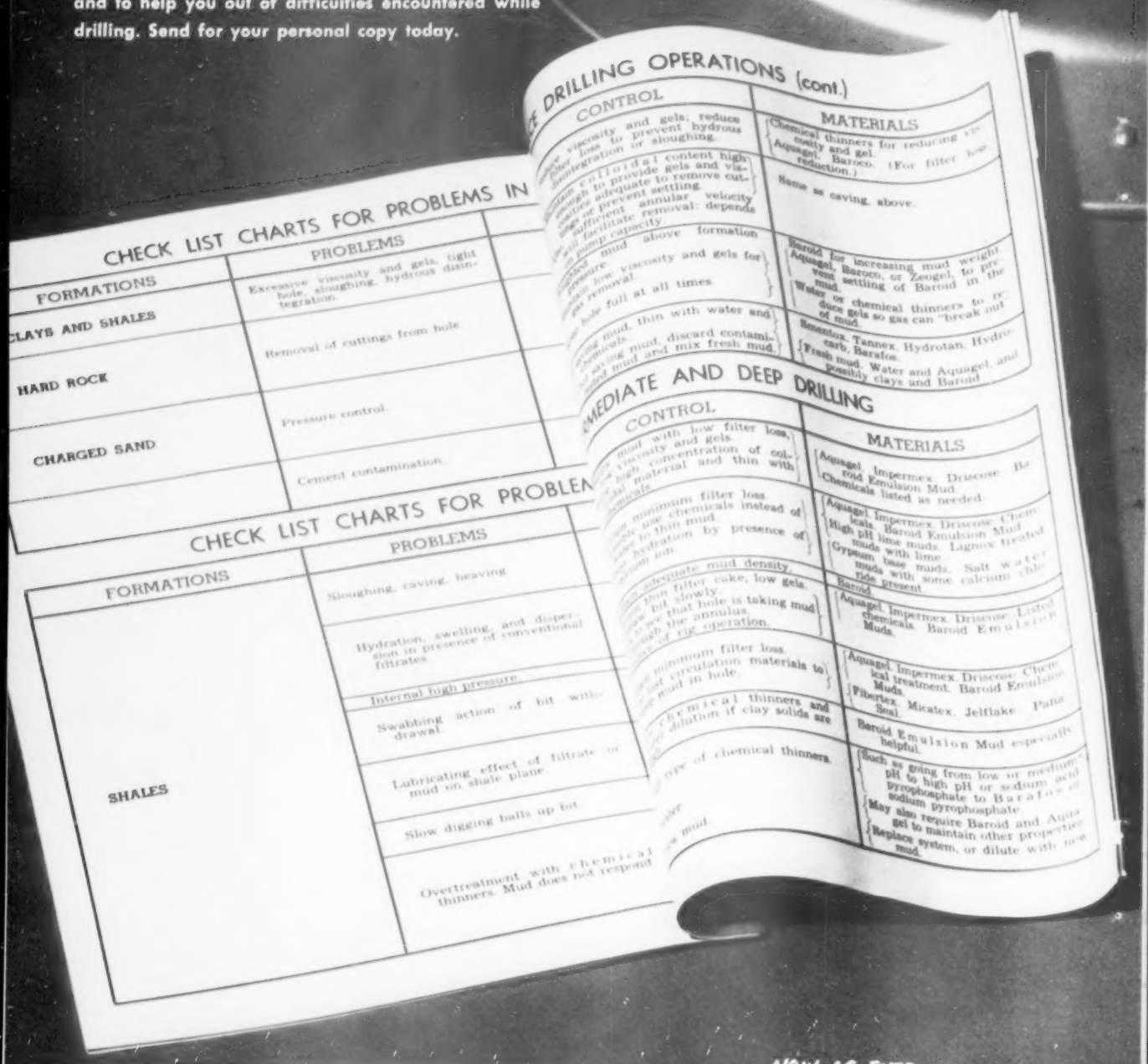
"TROUBLE-SHOOTING" CHARTS FOR DRILLING MUD PROBLEMS

These charts are useful as a guide in planning your mud program before spudding in, where you know the formations likely to be encountered; and to help you out of difficulties encountered while drilling. Send for your personal copy today.



CHECK LIST CHARTS FOR PROBLEMS IN ... DRILLING OPERATIONS (cont.)

FORMATIONS	PROBLEMS	CONTROL	MATERIALS
CLAYS AND SHALES	Excessive viscosity and gels; tight hole, sloughing, hydrous disintegration.	...viscosity and gels; reduce filter loss to prevent hydrous disintegration or sloughing.	Chemical thinners for reducing viscosity and gel. Aquagel, Barroco. (For filter loss reduction.)
		...colloidal content high enough to provide gels and viscosities adequate to remove cuttings or prevent settling. Sufficient annular velocity to facilitate removal; depends on pump capacity.	Same as caving, above.
HARD ROCK	Removal of cuttings from hole	...drilling mud above formation pressure. ...viscosity and gels for ...removal.	Baroid for increasing mud weight. Aquagel, Barroco, or Zeogel, to prevent settling of Baroid in the mud.
		...hole full at all times.	Water or chemical thinners to reduce gels so gas can "break out" of mud.
CHARGED SAND	Pressure control.	...drilling mud, thin with water and ...chemicals.	Bentonex, Tannex, Hydrotan, Hydrocarb, Barafos.
	Cement contamination.	...caving mud, discard contaminated mud and mix fresh mud.	Fresh mud. Water and Aquagel, and possibly clays and Baroid.

CHECK LIST CHARTS FOR PROBLEMS ... INTERMEDIATE AND DEEP DRILLING

FORMATIONS	PROBLEMS	CONTROL	MATERIALS
SHALES	Sloughing, caving, heaving.	...mud with low filter loss, ...viscosity and gels. ...high concentration of colloidal material and thin with ...chemicals.	Aquagel, Impermex, Driscose, Baroid Emulsion Mud. Chemicals listed as needed.
	Hydration, swelling and dispersion in presence of conventional filtrates.	...minimum filter loss. ...use chemicals instead of ...to thin mud. ...hydration by presence of ...ion.	Aquagel, Impermex, Driscose, Chemicals. Baroid Emulsion Mud. High pH lime muds. Lignox treated muds with lime. Gypsum base muds. Salt water muds with some calcium chloride present.
	Internal high pressure.	...adequate mud density.	Baroid.
	Swabbing action of bit with withdrawal.	...thin filter cake; low gels. ...bit slowly. ...that hole is taking mud ...the annulus. ...of rig operation.	Aquagel, Impermex, Driscose. Listed chemicals. Baroid Emulsion Muds.
	Lubricating effect of filtrate or mud on shale plane.	...minimum filter loss. ...circulation materials to ...mud in hole.	Aquagel, Impermex, Driscose. Chemical treatment. Baroid Emulsion Muds. Fibertex, Micatex, Jelflake, Paneseal.
	Slow digging balls up bit.	...chemical thinners and ...dilution if clay solids are	Baroid Emulsion Mud especially helpful.
	Overtreatment with chemical thinners. Mud does not respond.	...type of chemical thinners. ...mud	Such as going from low or medium pH to high pH or sodium acid pyrophosphate to Barafos or sodium pyrophosphate. May also require Baroid and Aquagel to maintain other properties. Replace system, or dilute with new mud.

BAROID P. O. Box 1675, Houston 1, Texas

Please send me my personal copy of Baroid's "Trouble-Shooting" Charts For Drilling Mud Problems.

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They Say—

New Depletion Idea

National defense requires an incentive for creation of reserve manufacturing capacity for emergency use. During the first World War an incentive was required to encourage development of mineral resources, and as a result the depletion allowance was adopted to stimulate discovery of new reserves of petroleum and other minerals. Outstanding results accomplished through the depletion allowance proved that it was a necessary step from a national defense standpoint.

We have reached the point in our present defense efforts where it becomes necessary to extend this incentive principle to all industries which are vital to defense. In order to provide the incentive for such industries to build reserve manufacturing capacity for emergency use, I would suggest certain tax exemptions which would apply only to that percentage of production capacity held in reserve. According to this plan, these incentive tax concessions would be cancelled when plants are operated at 100 per cent of their capacity or in excess of market demand.

Adoption of a workable incentive program for all essential industries would not only help forge a stronger national defense program, but would add vigor to the nation's economy through increased construction and employment. This incentive program for all industry would tend to stabilize business and greatly minimize "boom or bust" fluctuations in the nation's economy.

Instead of losing revenue through tax concessions, the Government would actually realize greater revenue because of the stabilizing influence of such an incentive program.

D. W. Hovey, president, Danaho Refining Co., Houston.

Gains to Come Harder

". . . None of us in the industry are likely to make our gains as easily in 1954—or make them as big—because there are signs that the market won't be quite as fat as it was in the past 12 months. During the early part of 1953, industrial production hit a peacetime high. During the early summer, employment was close to capacity levels, and consumer incomes were beyond anything we had seen to date. All of this contributed strongly to demand for

Reduce Pulling Costs...

due to ball and seat failure—Specify Carboloy® cemented carbide balls and seats

Increase your down well pumping equipment life as much as 20 times with Carboloy cemented carbide balls and seats.

The built-in wear-resistant capabilities of this metal make it especially effective in combating the acids and abrasive sands found in crude oil. This resistance to corrosion-erosion is unequaled.

Exceptional resistance to fluid wash, cuts, ball pounding and abrasive wearing is assured by 29 quality control checks performed during manufacture. Result: a uniform high-density ball and seat which maintains sphericity under even the severest impact and pressures.

Specify Carboloy cemented carbides when ordering balls and seats from your equipment manufacturer or oil-field supply store. Take advantage of the quality and wearability built into this product. For technical assistance or information on applying this wearproofing metal to other oil-field uses, please send coupon or have your equipment supplier contact us.

Other Carbide Applications:

CHECK VALVES

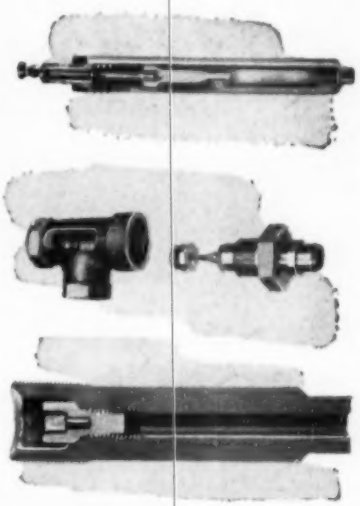
Gas-lift flow valves, wearproofed with Carboloy cemented carbide, showed no signs of wear after 9 months of continuous operation on a 3600-ft. well, operating at 400-500 B.P.D. rate and 450 PSI pressure. Well fluid was approximately 90% sand-bearing salt water.

MOTOR VALVES

Motor control valves with 18-8 stainless-steel stems and seats required replacement every 7 days because of abrasive wear. Stems and seats protected with Carboloy cemented carbide required *no service* after *17 months of use.*

FLOW BEANS

Carburized-steel flow-control chokes (used in Bonnie View Field) had to be replaced every 24 hours because of abrasive wear. Flow control chokes made of Carboloy cemented carbide gave continuous service for 18 months, with no shutdowns for choke replacement needed.



"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

CARBOLOY
DEPARTMENT OF GENERAL ELECTRIC COMPANY
11181 E. 8 Mile Blvd., Detroit 32, Michigan

We want to use Carboloy cemented carbide on _____
Our equipment supplier is _____
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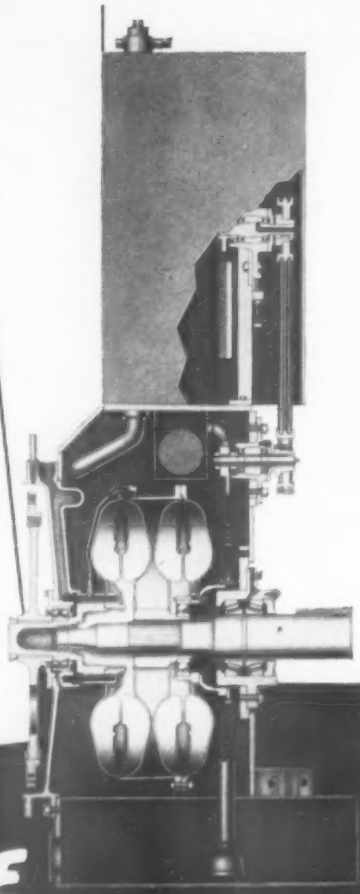
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

Drill Deeper, More Economically, With Twin Disc Model HUD Disconnecting Fluid Power Take-Off

1. Reduces impact shock up to 70% on driving and driven equipment.
2. Dampens starting shocks and overloads.
3. Allows full use of peak engine torque over an extended operating range.
4. Compounded drives can be more effectively synchronized.
5. Prevents engines from lugging or stalling under load.
6. Disconnect feature eliminates need for engine compound clutches.
7. On mud pumps, extends range of available speeds and pressures.



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on chains, clutches & running parts

Model HUD* Disconnecting Fluid Power Take-Offs

*Model HUD—available in sizes 21" and 27" to handle 100 to 600 hp engines. Operates with either cooling radiator or heat exchanger. Incorporates shortened oil sump to fit rig design. Write for complete information.

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CLUTCHES AND HYDRAULIC DRIVES

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motor fuel, and was reflected by the industry's sales.

"A slightly different wind is beginning to blow now, and we should adjust our sails accordingly. Industrial production is slowing down very gradually—partly because the Korean War has ended; partly because of governmental economy; and partly because the consumer's immediate wants, so far as he can afford to fill them, are more nearly satisfied than at any other time since the ending of World War II.

"Any slowdown—if, indeed, there is a slowdown—is certain to be temporary. (I mean as certain as anything can be, without benefit of crystal ball). All the signs point to a constantly rising standard of living for the American people—and automotive transportation is tightly woven into our standard of living. One of our most conservative economists tells me that a growth of one-third in gasoline consumption between 1953 and 1960 'seems quite within the realm of probability.'"

H. S. M. Burns, president, Shell Oil Co., in an article in Shell Progress.

Colored by Import Question

"The judgment of pipe line investors as to the future adequacy of markets for crude oil from this area cannot help but be colored by the import question.

"The crux of the problem is that imported oil, produced and transported at less total cost than domestic oil, is encroaching upon the market sorely needed by domestic producers."

John G. Pew, vice president in charge of production, Sun Oil Co., Philadelphia, speaking before a dinner meeting of the Sidney (Mont.) Chamber of Commerce.

CALENDAR

JANUARY

27-29 Ninth annual symposium, "Instrumentation for the Process Industries," Texas A. & M. College, College Station, Tex.

29 Southern Gas Association, accident-prevention round-table conference, Adolphus Hotel, Dallas.

FEBRUARY

1-5 National Association of Corrosion Engineers, annual short course in corrosion, Washington State College, Pullman, Wash.

4 Instrument Society of America, ninth annual regional conference, Hotel Statler, New York City.

8-9 Two-day conference on marine corrosion problems, University of California, Berkeley.

11-12 Western Petroleum Refiners Association, regional meeting, Hotel Beaumont, Beaumont, Tex.

14-18 American Institute of Mechanical and Metallurgical Engineers, Hotel Statler, New York.

15 American Society for Testing Materials, southwest district (Dallas-Fort

Worth), and National Association of Corrosion Engineers, joint meeting, Dallas.

17-19 Corrosion Control Short Course, fifth annual, Tulsa section of National Association of Corrosion Engineers, Mayo Hotel, Tulsa.

19-20 National Society of Professional Engineers, spring meeting, Hilton Hotel, Albuquerque, N. M.

22 American Association of Petroleum Geologists, Rocky Mountain section, annual meeting, Albuquerque, N. M.

26 Natural Gasoline Association of America, Permian Basin regional meeting, Lincoln Hotel, Odessa, Tex.

MARCH

1- 5 American Society for Testing Materials, spring meeting, Shoreham Hotel, Washington, D. C.

3- 5 American Petroleum Institute, Division of Production, Southwestern district, Rice Hotel, Houston.

4- 5 American Gas Association, transmission and storage conference, Jung Hotel, New Orleans.

8-10 American Institute of Chemical Engineers, Statler Hotel, Washington.

15-19 National Association of Corrosion Engineers, annual meeting, Municipal Auditorium, Kansas City, Mo.

17-19 American Petroleum Institute, Division of Production, Mid-Continent district, Biltmore Hotel, Oklahoma City.

23-April 1 American Chemical Society, annual meeting, Municipal Auditorium, Kansas City, Mo.

26 American Chemical Society and Sabine Area American Institute of Chemical Engineers, joint session, Beaumont, Tex.

29-31 Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, Tex.

APRIL

4- 6 Texas Independent Producers and Royalty Owners Association, Rice Hotel, Houston.

5- 7 American Society of Lubrication Engineers, Netherland-Plaza Hotel, Cincinnati.

6- 8 Petroleum Industry Electrical Association, annual convention and exhibit, Adolphus and Baker Hotels, Dallas.

8- 9 American Petroleum Institute, Division of Production, Rocky Mountain district meeting, Townsend Hotel, Casper, Wyo.

8- 9 Second annual instrumentation conference, Louisiana Polytechnic Institute, Ruston, La.

12-16 American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, and Society of Exploration Geophysicists, annual meeting, St. Louis.

13-15 Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, Okla.

14-16 National Petroleum Association, fifty-first semiannual meeting, Cleveland Hotel, Cleveland.

21-23 Natural Gasoline Association of America, thirty-third annual convention, Baker Hotel, Dallas.

22 Illinois Oil and Gas Association, annual directors meeting, Hotel Emmerson, Mount Vernon, Ill.

26-28 Southern Gas Association, annual convention, Houston.

MAY

2- 4 Independent Petroleum Association of America, midyear meeting, Cosmopolitan Hotel, Denver.

3- 5 American Geophysical Union, thirty-

You can cut "UNACCOUNTABLE LOSSES!"

FIG. 2500 SERIES GAUGE HEAD

If your process involves the storage of liquids in tanks, then one of the first places to look for an "unaccountable loss" is in the gauging of your tanks.

"VAREC" Automatic Tank Gauging applies a new principle to a time-tested method of gauge operation that assures dependable accuracy and simplified reading. It will also save time and manpower. There is "VAREC" Automatic Gauging Equipment for high and low pressures and all gauging requirements.

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fifth annual meeting, National Academy of Sciences, Washington, D. C.

3- 5 Air Pollution Control Association, annual meeting, Patten Hotel, Chattanooga, Tenn.

6- 7 American Petroleum Institute, Division of Production, Pacific Coast district meeting, Statler Hotel, Los Angeles.

9-12 Liquefied Petroleum Gas Association, annual convention and trade show, Conrad Hilton Hotel, Chicago.

10-12 American Petroleum Institute, Division of Transportation, Products Pipe Line Conference, Warwick Hotel, Philadelphia.

10-13 American Petroleum Institute, Division of Refining, midyear meeting, Rice Hotel, Houston.

14-15 Interstate Oil Compact Commission, General Oglethorpe Hotel, Savannah, Ga.

16-19 American Institute of Chemical Engineers, Springfield, Mass.

17-19 American Petroleum Institute, Division of Marketing, midyear meeting, Cosmopolitan Hotel, Denver.

24-26 American Gas Association, production and chemical conference, William Penn Hotel, Pittsburgh.

27-28 Natural Gas and Petroleum Association of Canada, Prince Albert Hotel, Windsor, Ont., Canada.

31-June 5 American Petroleum Institute, Division of Production, midyear committee conference, St. Francis Hotel, San Francisco.

JUNE

3- 4 Pennsylvania Grade Crude Oil Association, thirty-first annual meeting, Hotel William Penn, Pittsburgh.

6-11 Society of Automotive Engineers, summer meeting, Ambassador and Ritz-Carlton Hotels, Atlantic City, N. J.

13-18 American Society for Testing Materials, annual meeting and exhibit, Sherman and Morrison Hotels, Chicago.

17-19 American Petroleum Institute, Division of Production, eastern district meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

20-24 Canadian Gas Association, Banff Springs Hotel, Banff, Alta., Canada.

27
July 1 Petroleum Equipment Suppliers Association, nineteenth annual meeting, Manoir Richelieu, Murray Bay, Que., Canada.

AUGUST

17-19 Society of Automotive Engineers, Inc., international West Coast meeting, Georgia Hotel, Vancouver, B. C., Canada.

SEPTEMBER

9-11 Interstate Oil Compact Commission, Omaha, Neb.

12-16 American Institute of Chemical Engineers, Colorado Hotel, Glenwood Springs, Colo.

15-17 National Petroleum Association, fifty-second annual meeting, Traymore Hotel, Atlantic City, N. J.

28-29, Texas Mid-Continent Oil and Gas Association, annual convention, Baker Hotel, Dallas.

OCTOBER

7- 8 California Natural Gasoline Association, twenty-ninth annual fall meeting, Ambassador Hotel, Los Angeles.

11-13 American Gas Association, annual convention, Atlantic City, N. J.

11-13 American Association of Oilwell Drilling Contractors, annual meeting, Biltmore Hotel, Los Angeles.

14-17 Permian Basin Oil Show, Odessa, Tex.

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Men in the pipeline and processing industries are looking to Williams Pressure Service Company in Shreveport for hydrostatic testing. This new service was developed by Williams engineers who made complete hydrostatic service available as a turn-key job for the first time in pipeline history. Williams' services are adaptable to all sizes of pipelines and to a wide variety of pressure requirements. For complete hydrostatic pipeline testing . . . anywhere in the nation . . . call Williams. Crews on testing units will be on the job in record time and give continuous 24-hour operation until the job is done.*

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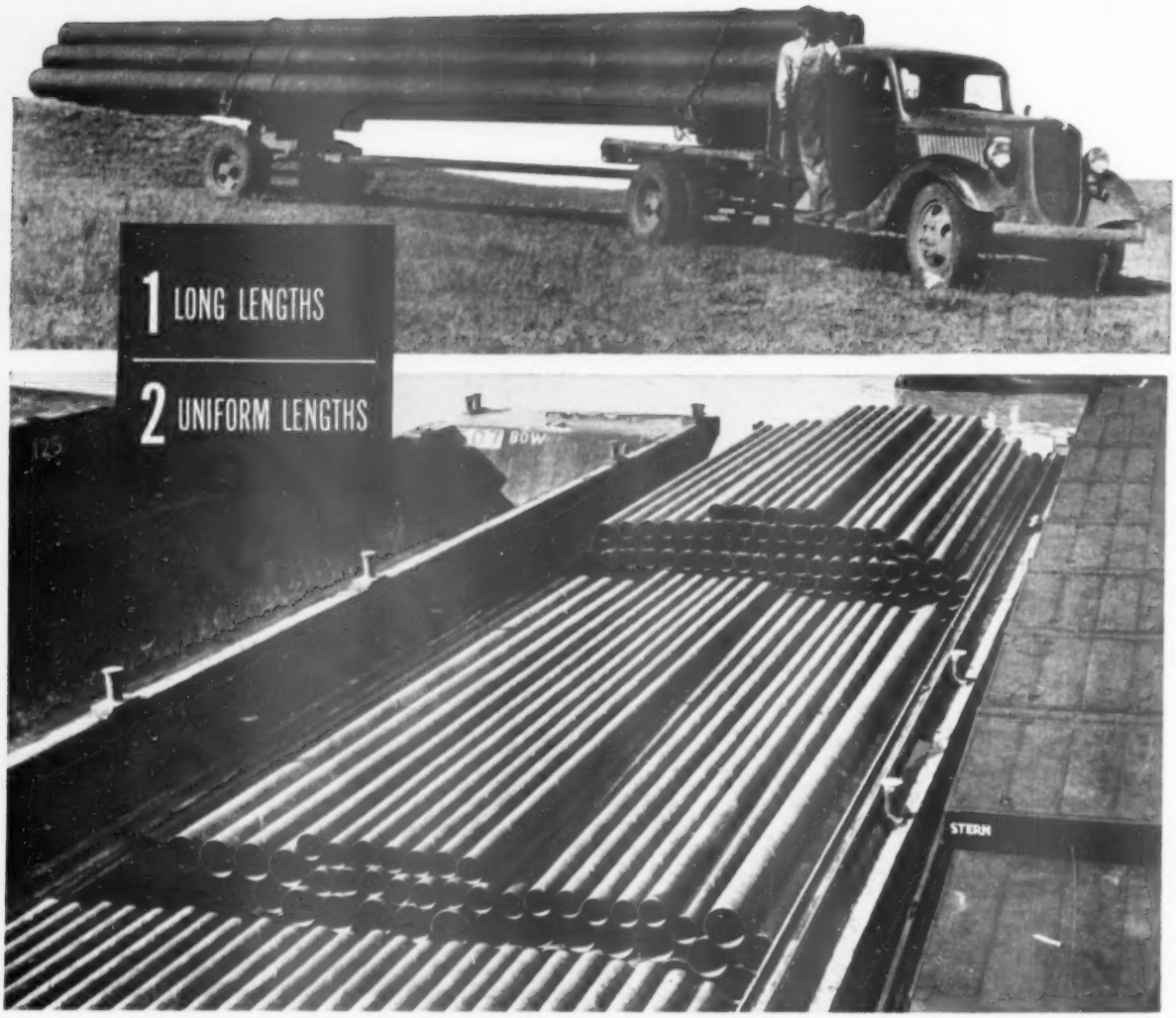
SHREVEPORT, LOUISIANA

Williams
PRESSURE SERVICE COMPANY
HYDROSTATIC PIPELINE TESTING



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You can get Armco Welded Steel Pipe up to 50 feet long—and in uniform lengths. Since exact lengths are known in advance, it's easy to compute the number of pipe sections required and how many joints have to be made. And longer Armco Pipe lets you reduce the number of joints needed by 25 per cent or more. With Armco Pipe you can save time, cut labor costs, speed installation and order the exact amount of pipe needed for the job.

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THE OIL AND GAS
JOURNAL
TULSA, OKLAHOMA

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JOURNALLY Speaking

This Is It

THIS is it—the "Annual": the Big Yellow Book's biggest effort of the year. More blood, sweat, and tears on the part of the entire staff go into this than into any other issue of the year. The amount of effort behind just a single figure is often prodigious.

It's the most popular and most used issue of the year, too. For weeks our phones have been ringing day and night (we've been working nights) because oil men far and near couldn't wait until this issue came off the press to get a figure or two they need in their planning. Sometimes we could accommodate them, but for the most part the important totals weren't compiled in final form until an hour or two before the presses were scheduled to start rolling.

This shows how much people value our reviews and forecasts. Tables of statistics may look pretty dull and forbidding to most people, but business is run by figures and the oil man who doesn't watch trends and keep up with what the rest of the industry is doing and thinking is apt to fall behind the parade in a hurry. So hundreds of people dig through this annual issue to get dope to use in their own operations. We know, too, that they keep this issue around all year for constant reference.

Among all its many valuable features, the most important probably is its timing. We have only about 3 weeks after the close of the year to compile the complete record of what happened and gather information for our forecasts of the new year. That means we have to start many, many weeks in advance, working first with partial figures and estimates and then making final adjustments when the December statistics are available. It ruins the holidays for most of the staff, but it's a tradition of ours to be firstest with the mostest.

We couldn't do this job without the cooperation of many people in the industry. Our figures and forecasts aren't dreamed up in an ivory tower, but are a combination of the very best information scrounged from all over. Major companies and independent operators willingly let us pick their mental pockets and give us some of their most secret dope, knowing that it will be kept in confidence and pooled into totals and averages.

For instance, our forecast of supply and demand is the composite of the painstaking calculations of a dozen of the industry's top economists. Our estimates of proved reserves were gathered from leading geologists and production engineers in the same way. Ditto for our forecasts of capital investment and all the other vital information in this issue.

So if you want a book telling where the oil and gas industry has been and where it is going, this is it.

Notable Feats

OUR esteemed contemporary, the National Geographic Society, has also put out an annual review, featuring exploration highlights and significant changes made on the face of the earth during 1953. Geographers' feats of exploration are different from those of oil men, so it is natural that their annual review is quite unlike ours. But there are some interesting parallels.

For example, the Geographic notes that last year men scaled the 29,002-ft. summit of Mount Everest, descended 10,330 ft. into the Tyrrhenian Sea, and clambered 2,400 ft. down into a French cave. Just for fun, compare these achievements with the deep-drilling records of the oil industry as recorded in this issue.

In hailing engineering achievements, however, the Geographic does not overlook the oil industry. Along with notable dams, tunnels, superhighways, railroads, and bridges completed, it points out that for the first time 1953 saw pipe lines crossing the Continental Divide — in Utah and the Canadian Rockies — and under the waters of the Great Lakes in the deepest underwater crossing ever attempted.

We oil folks rate in anybody's annual review.

—*Henry D. Ralph.*

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Hinge-Lok Casing Centralizers

...to provide ample all-around cementing space for all casing programs, regardless of varying hole sizes or conditions.

"REACH" (Bowed Height) IS THE VITAL FACTOR All Baker HINGE-LOK Casing Centralizers have greater reach (or bowed height) of springs in corresponding ranges than any other casing centralizers on the market. Increased reach means adequate, all-around cementing space, even though the hole size may vary considerably from the drill bit size.

WHY REACH IS NEEDED In oversize sections of open hole, centralizers with insufficient reach frequently fail to contact the wall of the hole and thus perform no work. As a result, adjacent centralizers above and below can be so overburdened that casing-to-wall contact is apt to occur. The end result is likely to be a poor cement job at any such point of contact.

The increased *reach* of Baker HINGE-LOK Casing Centralizers ensures that each centralizer will contact the wall of the hole within its range and will contribute its share toward an effective centering job.

MAXIMUM STRENGTH The engineered bow shape of the centralizer springs provides *greater landed centering force* than can be obtained from any other available hinge-type centralizer covering the same range of open hole sizes.

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20-RANGE
Product No. 9112
For LESS-THAN-NORMAL CLEARANCE where no problem of over-size or irregular hole is anticipated.

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This will be a normal year—meaning a good one for oil

WITH all American industry taking a sober look at the probable trend of business this year, the figures in this issue of the Journal are quite reassuring to the petroleum industry.

Most industries are preparing for the second-biggest year in history, counting on small declines from 1953 peaks. For oil and gas, 1954 will be the second-biggest year for drilling and some other activities, but should see new records set in many divisions.

Most industries have been "spoiled" by the rate of expansion in demand, which has continued more or less since the end of the war. Fortunately, businessmen recognize this and realize that the lush growth is over and that they must prepare for stiff competition and even some slackening in activity.

THIS is the chief value of a detailed statistical review such as the Journal presents this week. It gives the industry a yardstick to evaluate its position in realistic terms.

It is not wise to draw sweeping conclusions from a simple comparison between the forecast for 1954 and the actual record of 1953 in any division of the petroleum industry. There were some abnormal things about 1953—as there are about every year—and when percentage changes are small a simple comparison can give an erroneous impression.

Look, instead, at trends over the past few years and over the past 15 or 20 years. Average off the peaks and valleys and compare 1954 with the trend line.

It will be seen that the demand for petroleum products enjoys a steady growth, greater than the increase in population, and that activities in the industry—from drilling to refinery construction—keep in step. This longer-range growth trend is much more significant than the individual ups and downs of any arbitrary 12-month period.

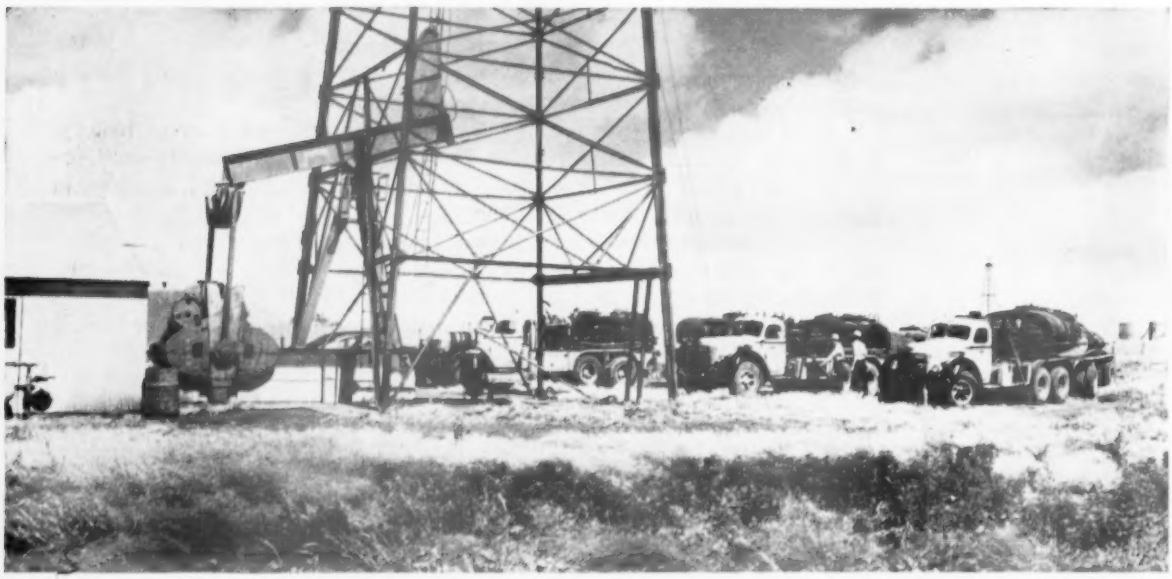
WITH such a comparison it is evident that the petroleum industry is slowing down, yes, but not falling off. The aftereffects of World War II and the Korean crisis have worn off and the industry is adjusting to a rate of growth which is modest but nevertheless steady.

Economists are beginning to feel that the 1952-54 period will be considered a "new normal" for most industry, meaning that it will be the base for future indexes of activity and the standard for calling other years good or bad.

It may turn out that the average of these same 3 years will be about as close to "normal" as the oil and gas industry will ever get. By that standard, the forecasts make 1954 look very good indeed—mighty close to the biggest year in history in some divisions and a little bit bigger than the biggest in others.

PRODUCTION INCREASED FROM 60 TO 450 BOPD WITH XM ACID

DOWELL XM Acid treatment boosted production after ordinary acid failed to improve flow



This new oil well had been completed in a dolomitic limestone formation. Ordinary acid had failed to improve production from this and neighboring wells. A trace of emulsion and incomplete return of the spent acid suggested that effective permeability had been reduced by swollen silicates plugging the pore spaces.

The operator decided to employ a Dowell treatment using XM Acid to control silicate swelling and increase production. As a result, production went from 60 to 450 BOPD and the XM Acid treatment resulted in a quick kick-off and clean-up for the operator.

Other Dowell addition agents are designed to remove mud from producing formations; to speed reaction rate; to increase penetrating ability; to increase wetting ability and prevent emulsions; to remove "gyp"; to trace fluid movement; to increase acid weight.

For more information on Dowell addition agents and the many oilfield services and products offered by Dowell, call the nearest office. Or write directly to Tulsa, Dept. A-11.

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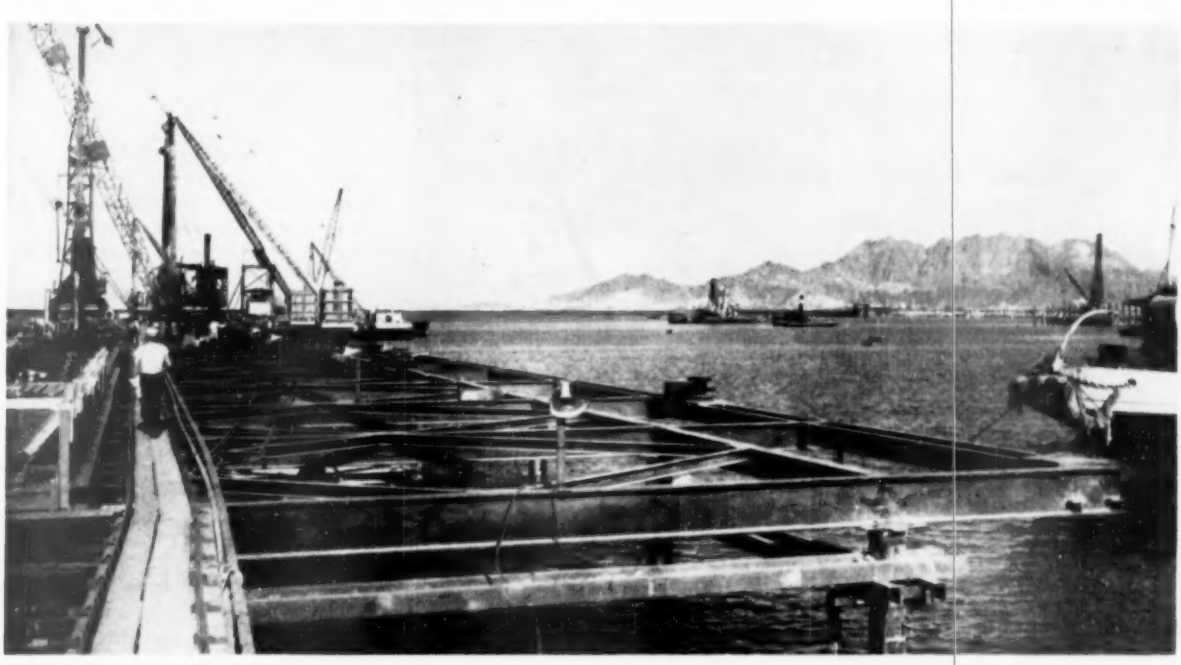
FOR OIL INDUSTRY CHEMICAL SERVICE

THIS WEEK... ...IN THE NEWS



WORLD'S BIGGEST refinery-construction job now under way is the 120,000-bbl. project of Anglo-Iranian Oil Co., Ltd., at Aden, in the Middle East. This view shows a finger jetty under way, with approach steelwork already in position. The refinery, to cost an estimated $126,000,000, is scheduled for completion in December. For details on the operation, see page 115.

PRODUCTION—Texas Railroad Commission flashes green light for SACROC to proceed with huge water flood in Kelly-Snyder field of Scurry County, West Texas. . . . Full-scale injection expected to begin in 4 to 6 months. . . . ¶Organization of coordinating committee to ramrod sweeping overhaul of Oklahoma's method of setting crude-production allowables is completed with the naming of seven more members. . . . ¶Texas crude allowable for February set at 2,830,448 bbl. daily, about 6,025 bbl. daily above the initial January allowable but considerably below adjusted figures later in the month. . . .

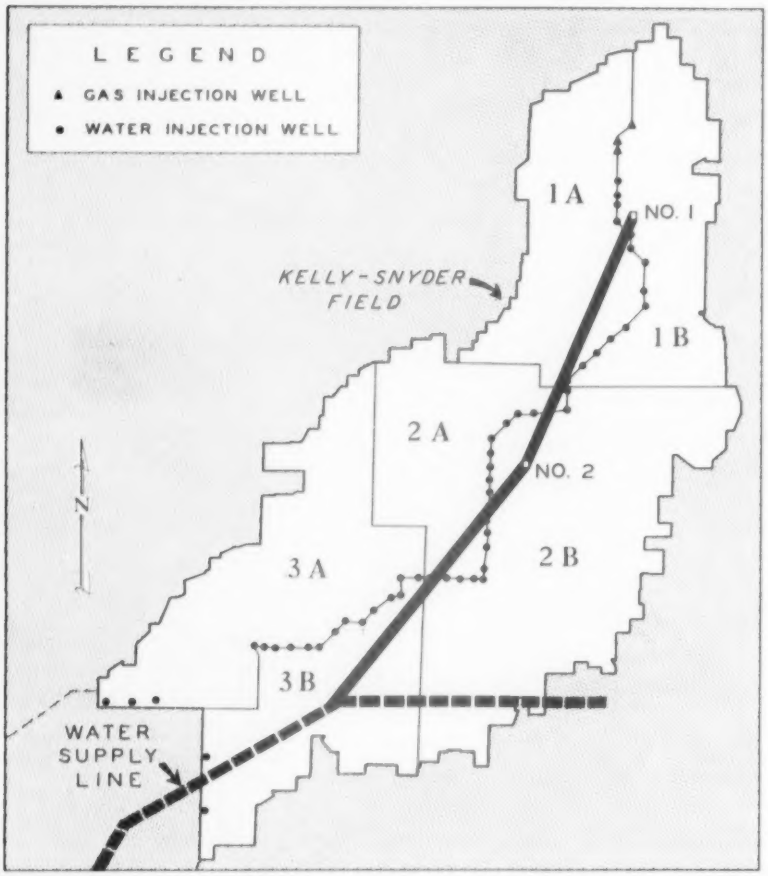
EXPLORATION—Cities Service and Forest Oil announce plans for first test, presumably to Ellenburger, of 17,000-acre chunk of Dora Roberts Ranch in Midland and Ector counties, West Texas. . . . Companies paid $5,000,000 cash bonus for the tract last summer. . . . ¶General Crude Oil drilling first wildcat on 78,000 acres of Swenson Land & Cattle Co. ranch in Cottle, Motley, King, and Dickens counties in West Texas. . . . Objective is the Ellenburger. . . . ¶M. L. Mayfield wildcat in eastern Assumption Parish in southeastern Louisiana flows 2,500,000 cu. ft. of gas and about 100 bbl. of condensate per day from lower Miocene sand at 14,224-30 ft. . . .

GOVERNMENT—Supreme Court reverses itself, announces it will rule on question of FPC jurisdiction over producers of natural gas. . . . Court says, too, it will hear 1 hour of argument February 1 on acceptance of petitions filed by Alabama and Rhode Island for a ruling on the constitutionality of the act returning tidelands to the states. . . . ¶Eisenhower budget calls for reduction in funds for Interior Department oil and gas activities. . . . Provision made, however, for setting up the Oil and Gas Division as successor to PAD. . . . ¶Security Council asks greater freedom for Navy in operating its petroleum reserves. . . .

INTERNATIONAL—Gulf begins production tests on its wildcat near Ragusa, Sicily, after drilling past a pay zone at 6,200 ft. . . . ¶U. S. Department of Justice is expected to decide soon just how far American oil companies can go in a joint venture to return Iranian oil to the world market. . . . ¶"Denationalization" oil bill before the Turkish Parliament is expected to be passed quickly to grant oil concessions to foreign firms on favorable terms. . . . Tide Water expects to buy second tanker load of Wafra crude from Neutral Zone. . . . Lifting for Pacific Western is slated for late this month. . . .

ACTIVITY—Production of crude and lease condensate averaged 6,335,700 bbl. daily for week ended January 16, up 47,850 bbl. daily. . . . ¶Total well completions increased 95 wells during the week to 1,029. . . . ¶Wildcat completions gained 66 wells to 246 for the week. . . . ¶Rotary rigs operating in the United States decreased 8 rigs for week ended January 18 to 2,499 compared with 2,487 at the same time last year. . . .

TRENDS—Stocks of the four major products dropped 7,062,000 bbl. for week ended January 16, the largest weekly decrease reported since December 1950. . . . Light and heavy fuel stocks decreased 10,270,000 bbl., but gasoline inventories increased 3,208,000 bbl. . . .



SOME CHANGES were made in SACROC's proposed rules. The three segments were split along the line of injection wells, with the provision that allowables could not be transferred between wells on opposite sides of the line. White squares on water-supply line are water-injection stations. The third injection station is at the junction of the 27-in. line and Snyder's water-supply line.

SACROC Gets Approval

Railroad Commission approves water-gas injection program for Scurry's Canyon Reef after months of bitter hearings

Paul Swain

AUSTIN.—Full-scale water injection in the huge Kelly-Snyder field's Canyon Reef should be under way in from 4 to 6 months as a result of the Texas Railroad Commission's order last week clearing the way for the secondary recovery program.

The commission's order came more than a year after the field was unitized and after a lengthy series of bitterly contested hearings in which the program was opposed by interests headed by W. A. Moncrief, Fort Worth.

While the commission approved the line-type flood proposed by the Scurry Area Canyon Reef Operators Committee, the regulatory body declined to approve several proposed field rule changes asked by SACROC. The order, however, leaves the question of further rule changes open for future hearings.

The order . . . In issuing the long-awaited order, the commission reviewed in general terms the testimony covered in some 2,902 pages of transcript, plus legal and engineering briefs and noted conflicting opinions of the additional recovery to result.

The commission pointed out, however, that waste is occurring in the field and secondary-recovery operations are necessary to halt further decline in reservoir pressure. SACROC's program, the commission concluded, provides a feasible operation with a "minimum of interference" to non-injecting property owners and gives all operators a "fair and reasonable" chance to produce their oil.

"It may be anticipated," the order continued, "that as the program progresses, new and additional rules, regulations, and operating practices may be deemed necessary." The order provided that such matters will be considered in separate formal commission hearings.

The order included a transfer-of-allowable rule which requires no allowable in excess of a well's ability to produce can be transferred. It also provides operators may not transfer an allowable to a well closer than 1,320 ft. to a tract not included in the unit.

Allowable transferred to any well located between 1,320 ft. and 2,640 ft. of a tract not in the unit may not exceed half the normal allowable of the well to which the transfer is made.

The commission divided each of the three operating segments of the unit to make six production sectors within the unitized area. The order provided that allowables may be transferred within these six sectors but not between them.

Not approved . . . The commission failed to approve two rule changes asked by SACROC that might be regarded as major points in the project.

It declined to make any change in the 2,000:1 gas-oil ratio for the field. SACROC had asked for a 1,000:1 ratio.

Also denied was the request for a "bonus" allowable of 0.2 bbl. of oil for each barrel of water injected.

Line-type flood . . . SACROC's project calls for gas injection in three wells at the extreme north edge of the mammoth unitized field and water injection in another 53 wells that follow the crest of the Canyon Reef in a southwestward direction.

All equipment, including water lines, pumps and water-treatment facilities, was purchased months ago and is now in Snyder, where H. H. Allen, unit manager, and a staff of engineers have set up headquarters. It is understood that Brown & Root Co., Houston, has been awarded the contract for installation of the water-injection equipment.

Olson Co., Houston, will install equipment for the experimental gas-

injection phase of the unit. The compressor station planned for this operation will have capacity to handle between one-third and one-half the residue gas from a gasoline plant in the field.

Water supply . . . Water for the operation will be obtained from the Colorado River Municipal Water District's lake created by a dam on the river less than 10 miles southwest of the southern limit of the unit. A 27-in. water line from the lake was built to join an old 21-in. line serving Snyder. The unit's three water-injection stations will be served by 18 and 20-in. lines.

Allowable Steady

Texas February oil output boosted 6,025 bbl. daily

AUSTIN.—The Texas Railroad Commission continued its battle against excess stocks last week, holding the state's crude-oil production allowable for February to 2,830,448 bbl. daily.

This is 28,220 bbl. daily below the adjusted allowable on January 9 and up 6,025 bbl. daily from the initial January allowable. However, production from new wells brought in during February is expected to bring the month's production about in line with January.

In announcing the cut, Gen. E. O. Thompson, commission chairman, said "stocks have been working off fairly satisfactorily the last 3 or 4 months as far as crude is concerned, but gasoline stocks are still very, very high and will continue to accumulate until the gasoline-consuming season starts up again.

"All of the good that has been accomplished in the past few months in the way of reducing crude stocks has been pretty well offset by refiners insisting on high throughput, and it seems about the only way to work off excess gasoline is to reduce crude production until the gasoline stocks have been reduced to the point where they are not in excess of market demand."

A 15-day state-wide producing schedule, including East Texas, was announced for the 28-day month of February—a 2-day cutback from the 17 for January's 31 days. January marked the only month within the past 6 that the allowable had been increased. This was due to the resumption January 1 of full-scale production in Spraberry Trend area field.

The new schedule was requested by three producing companies — Phillips Petroleum Co., Stanolind Oil & Gas Co., and Humble Oil & Refining Co. Sun Oil Co. and Shell Oil Co. asked for 17 days which would have resulted in an average daily increase of 230,000 bbl.

Current total of crude oil in storage is 270,000,000 bbl., 10,000,000 bbl. over the figure estimated last year by several firms as being a satisfactory figure, Thompson said. However, he said, stocks are being reduced and "4 more weeks will put us right on the button."

ALLOWABLES BY DISTRICTS
(Barrels per calendar day)

	February	January 9	Change
Dist. 1	45,421	45,883	— 462
Dist. 2	137,872	140,712	—2,840
Dist. 3	442,691	448,266	—5,575
Dist. 4	249,069	252,189	—3,120
Dist. 5	47,308	47,583	— 275
Dist. 6 (outside East Texas)	116,353	118,583	—2,230
Dist. 6 (East Texas field)	228,790	233,816	—5,026
Dist. 7-B	153,350	153,737	— 387
Dist. 7-C	194,939	197,073	—2,134
Dist. 8	874,674	882,570	—7,896
Dist. 9	234,612	233,788	+ 824
Dist. 10	105,369	104,468	+ 901
Total	2,830,448	2,858,668	—28,220

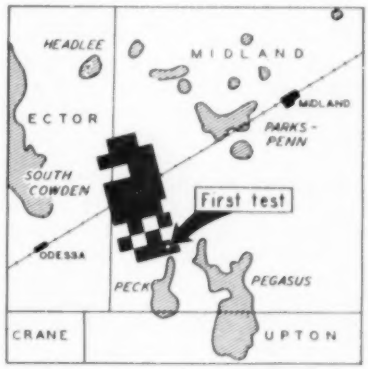
First Test Planned

Forest, Cities Service pick Roberts ranch well location

MIDLAND.—Forest Oil Corp. and Cities Service Oil Co. have announced plans for the first exploratory test on their 17,000-acre Dora Roberts Ranch land, lying in Midland and Ector counties of West Texas.

Forest and Cities Service purchased the oil and gas lease and part of the minerals of this tract last summer for a cash bonus of approximately $5,000,000. *(The Oil and Gas Journal, August 24, 1953.)*

Location for the first test, presumably to the Ellenburger, will be in Section 46, Block 41, Township 3 South, T&P Survey, which is in the southeast corner of the tract. Nearest production to the well site is 1½ miles south, which was an Ellenburger extension to Sweetie Peck field, drilled by Sinclair Oil & Gas Co. One-half mile northeast is Warren Petroleum Corp. 2 Sanders, a small Pennsylvanian discovery.



ACREAGE INVOLVED in General Crude deal lies in the center of these four counties. First wildcat is now drilling.

Ranch Block Leased

General Crude plans five wildcats on 78,000 acres

GUTHRIE, Tex.—General Crude Oil Co. has acquired leases on approximately 78,000 acres of the Swenson Land & Cattle Co. ranch, covering a portion of each of four West Texas counties along the Matador arch.

The acreage is in southwestern Cottle, southeastern Motley, northwestern King and northeastern Dickens counties.

The first test of the lease block already is drilling below 5,330 ft. with a projected depth of 6,500 ft. The well is General Crude 1-B Swenson, southwest of Paducah in Cottle County.

Terms of the deal call for five Ellenburger wildcats and a like number of shallow tests. General Crude will pay a cash bonus of $60,000, plus annual rentals of $1 per acre.

Importance of the deal lies in its exploration of undrilled areas away from the trend of proved fields. Dickens County's only production is the one-well Girard pool, opened in 1953 from a thin (Tannehille) sandstone section at 4,400 ft. Initial potential was 115 bbl. on the pump.

King County exploration last year opened the Tap pool, southeast of Guthrie, which found flowing production from Pennsylvanian Strawn sand at 5,520 ft.

General exploration work over the past few years has added a number of Ellenburger-producing areas, starting in Nolan County, and working through Fisher and Stonewall counties.

ATTENDING THE MEETING of the Pipe Line Contractors Association in Houston last week was the group pictured above, including some newly elected and some outgoing officers. Seated, left to right, are Felix M. Johnson of Trojan Construction Co., Oklahoma City; T. A. Hester of Oklahoma Pipe Line Constructors, Dallas; R. P. Gregory of Houston Contracting Co., Houston; R. H. Fulton of R. H. Fulton & Co., Lubbock, Tex.; G. A. Manuel of Williams-Austin Co., Pittsburgh, the new president; and Robert D. Sheehan of Sheehan Pipe Line Construction Co., Tulsa. Standing, left to right, are W. E. Honey of Latex Construction Co., Atlanta; C. C. Bledsoe of Midwestern Constructors, Inc., Tulsa, new vice president and outgoing treasurer; Robert Thomas of Texas-Louisiana Contractors, Fort Worth, outgoing president; James P. Neill of Western Pipe Line Constructors, Inc., Austin, new first vice president and outgoing vice president; J. W. Sharman of Associated Pipe Line Contractors, Inc., Houston; and Richard A. Gump, executive secretary, Dallas.

Pipe-Line Letup Seen

Construction activity to drop 14 to 15 per cent in 1954 due principally to slow start, Thomas tells contractors

Paul Reed and William P. Sterne

HOUSTON. — Pipe-line contractors can count on another big construction year in 1954, but it won't be as big as 1953.

Construction activity will be off about 14 to 15 per cent from last year, Robert Thomas, managing partner of Texas-Louisiana Constructors, Fort Worth, and president of the Pipe Line Contractors Association, said last week.

Thomas spoke during the sixth annual meeting of the association at the Shamrock Hotel here January 18-20.

The drop in activity this year will be accounted for largely by a slow first few months due to late starting of some of the large number of major pipe lines now planned, Thomas said.

Last year, he said, 14,000 miles of lines were laid, including 5,000 miles of crude lines, 5,000 miles of natural-gas-transmission lines, and 4,000 miles of product lines.

The pipe-line industry spent $300,000,000 to lay these lines, and 85 per cent of the work was done by members of the contractors' association, he said.

He would make no prediction as to how many miles of pipe would be laid during 1954, but said that construction of product and natural-gas lines probably would predominate.

Thomas said that Canada should offer the greatest opportunity for the pipe-line contractor during the next 4 or 5 years. Canada's importance was further emphasized by John R. Scott, vice president of Republic National Bank of Dallas, who told the group that lines crossing the United States and Canada will receive more emphasis, as will facilities to tap the oil reserves of the Rocky Mountain area.

Safety stressed . . . Perhaps the one topic commanding the most attention during the convention was that of safety. Two addresses were devoted to safety and to the setting up of effective safety programs as a means of cutting job costs.

R. P. (Phil) Gregory, of Houston Contracting Co., Houston, in an address on "Safety in Pipe Line Construction," emphasized the importance of setting up and conducting an effective safety program designed to acquaint personnel with the many dangers involved in pipe lining and how to cut down on accidents.

"The entire pipe-line-contracting business will benefit through lower insurance rates if we get behind the safety programs and reduce our lost-time accidents," he said.

Contractors, in all cases where possible, should appoint full-time safety supervisors or instructors who could plan a practical educational program designed to make the job safer.

Gregory said that cost of accidents to the contractor is four times what it costs the insurance carrier, due to delays and replacement of personnel. He called attention to the fact that the largest number of pipe-line accidents, 40 per cent, happen in the right-of-way gang.

Much improvement has been made in reducing accidents in the dope gang, the percentage of the total of which is now down to 7 per cent, Gregory said. Credit for safer dope-gang operations should be given to the equipment companies, he said.

Following Gregory's address, the association made 20 awards to various contractors who had good safety records for 1953.

Savings from safety . . . J. Doyle Settle, assistant to the vice president of the American Association of Oilwell Drilling Contractors, Dallas, told the group of the remarkable progress made by A.A.O.D.C. in bringing safety to the rig floor. Settle pointed out the tremendous advances made in cutting

PIPE-LINE CONSTRUCTION MEN in a group photographed at the annual contractors' meeting include, left to right, J. T. Brodie, Brodie Construction Co., Amarillo, Tex.; Myrle Rumsey; Dewey Whitworth, of Ray L. Smith & Sons, Inc., El Dorado, Kans.; J. T. Raley, Transcontinental Gas Pipe Line Corp., Houston; Clyde V. Troth, Troth Construction Co., Britton, Okla.; and J. T. Behrenfeld, Pipe Line Supply Co., Houston.

lost-time accidents around the drilling rig and said that pipe liners could easily adapt such a program to their operations.

Settle said that the drilling-contractors association did not claim that its program is "ideal," but that it certainly had been effective in reducing lost-time accidents and had resulted in lowering of workmen's compensation-insurance premiums.

For instance, he said, from 1938 to February 1950, there was a decrease in the insurance rates of approximately 35.5 per cent, representing a saving to the drilling industry of $2,500,000 per year. During 1952 there was a considerable increase due to a rise in costs generally, including increased benefits and other "inflation factors." This rise was not due to an increase in lost-time accidents around the rig, he said.

New rates for the 1954 policy year, effective December 1, 1953, reflect a reduction of 52 cents on average premiums in Texas, he said, and there should be a $500,000 saving on the $100,000,000 annual business in Texas alone.

For 1954, workmen's compensation costs will be more than $1,000,000 less for the drilling industry than last year, due to the lowered accident rate, he said.

Settle said that A.A.O.D.C. carries on its program "around the clock," issuing numerous safety posters, "hints" on safety around the rig, and providing safety-record forms for drillers to fill out and keep on accident-free days, etc.

He said that there was a pronounced similarity between the drilling and pipe-lining businesses in that the hazards are virtually the same. If such a safety program were set up by the Pipe Line Contractors Association, he said, similar good results undoubtedly would be realized.

In comparing figures, Settle said that insurance costs in accidents in oil-well drilling have been running $20,000,000 per year, which indicates a total loss to contractors of $100,000,000 resulting from all of the effects of the injuries. Total cost of injuries in pipe-line construction would run around $50,000,000 per year, he estimated.

Essential in the safety program of drilling contractors, Settle said, are the weekly rig meetings conducted by drillers and tool pushers to discuss safety.

A significant development in drilling safety is the new program of the South Texas Safety Alliance, which serves contractors with seven rigs or less. Contractors operating on this scale usually do not have a safety supervisor.

The alliance collaborates with the University of Texas, which furnishes safety supervisors. Half of the expense is paid by the university, the other half by the contractors.

Higher pressures . . . Now that pipe lines are being designed for higher pressures, the relationship of the engineer to the contractor is becoming more important in construction projects, according to C. C. Whittlesey, executive vice president of Ford, Bacon & Davis Corp.

Contractors are required to build in accordance with the new code for pressure requirements, but the engineer must keep in mind that the human element cannot be designed out of pipe lining.

Engineers should make fair estimates of cost of the work so that it can be done within contractors' estimates, with money left over for the contractors' profit. Contractors should protect themselves by discussing with clients the phrases they do not like in contracts in advance of signing.

Trouble in contract agreements should be anticipated by advanced study of the route of a proposed project. Frequently, he said, as much as $1,500,000 is spent on preliminary preparations for a project before Federal Power Commission approval is given. Before a job starts, it would be advantageous to hold a conference for the client's men, contractors, engineers, spread foremen, and top inspectors, to prepare for construction which would be as fast and economical as possible, he said.

Accounting important . . . Specific accounting on the part of contractors not only aids in making adjustments with pipe-line owners, but it is also becoming more important in dealings with the Bureau of Internal Revenue, A. W. Tolman, Jr., of Peat, Marwick, Mitchell & Co., told the contractors.

Basically, of course, accounting should be a tool for management in providing for accumulation and allocation of office overhead and of equipment to various jobs, and for the itemizing of such details as cash and quantity discounts and adjustments for workmen's compensation, he said.

By keeping adequate records of job costs, contractors can avoid having the Bureau of Internal Revenue rewrite their books, Tolman said. Under the new income-tax regulations, some contracting firms will find it more economical to increase salaries and reduce dividends, provided that salaries are not unreasonably high.

There appear to be more-favorable opportunities for establishing higher rates of depreciation. However, if depreciation rates appear to be unreasonable, the Bureau of Internal Revenue may assign an engineer to investigate.

New officers . . . New president of the association, elected January 19, is G. A. Manuel, president of Williams-Austin Co., Pittsburgh.

Other new officers are: James P. Neill, Western Pipe Line Constructors, Inc., Austin, first vice president; Clark C. Bledsoe, Midwestern Constructors, Inc., Tulsa, vice president; John M. Thomas, H. C. Price Co., Bartlesville, Okla., treasurer; and Richard A. Gump, Dallas, executive secretary.

New directors include: Ray Leigh Smith, Ray L. Smith & Son, Inc., El Dorado, Kans.; Oscar R. Burden, O. R. Burden Construction Corp., Tulsa; Kenneth A. Owen, Parkhill Trucking Co., Tulsa; R. P. Gregory, Houston Contracting Co., Houston; T. A. Hester, Oklahoma Pipe Line Constructors, Dallas; John H. Williams, Williams Brothers Co., Tulsa; Earl Allen, Associated Pipe Line Contractors, Inc., Houston; and M. K. McFarland, Lone Star Constructors, Dallas.

Tax Increase Opposed

Mississippi body told state already has highest taxes in nation, industry hasn't yet recovered exploration expense

JACKSON, Miss.—Strong opposition to a proposed increase for 6 to 8 per cent in the Mississippi oil and gas severance tax has been voiced by five Mississippi oil industry representatives before the state senate finance committee.

Appearing before the committee were E. D. Kenna of Jackson, executive vice president of the Mississippi-Alabama division of the Mid-Continent Oil and Gas Association; E. A. Vaughey of Jackson, an independent producer; George Gardiner Green of Laurel, Mid-Continent Oil and Gas Association division president; Dick D. Quinn of Jackson, a certified public accountant; and Ed Brunini of Vicksburg, an attorney.

The committee is considering two bills to hike severance taxes on oil and gas as part of a "package" plan to bring in $17,775,000 annually to finance a school equalization program. Several other tax measures—a sales tax boost and a cigarette tax increase—are included in the "package" plan.

Kenna, citing industry investment and return in Mississippi, said the severance tax proposal would raise the severance rates 33⅓ per cent, more than a fair share of the state's tax load.

He said the industry is still $300,000,000 "in the red" in Mississippi because of the cost of exploration and development.

Highest in nation . . . Kenna pointed out that the Mississippi gas severance rate is the highest in the nation. He said Louisiana's severance tax is higher than Mississippi's, but Louisiana permits a 27½ per cent depletion and certain income tax benefits while Mississippi allows none.

Vaughey, who has production in Mississippi and Louisiana, told the committee "Mississippi's severance tax and state income tax together on oil are higher than Louisiana's severance tax and state income tax together on oil" even though Mississippi's severance tax is lower.

". . . due to the fact that all other producing states allow depletion similar to the federal government and Mississippi does not, and also does not recognize the federal taxes one has to pay," Vaughey said, "we find that because we live in Mississippi we cannot compete on an equal economic basis with other oil producers who happen to live in other states."

Deterrent . . . Green warned that tax increases may "act as a deterrent to development in the state."

Quinn presented a tax study of typical oil producers showing Mississippi at the head of the list. He said that in Mississippi the severance tax is pegged to the price of crude oil, while in Louisiana it is a fixed amount. Income and severance go hand in hand, he said.

Product Stocks Dip

Seasonal climb ended in November, bureau reports

WASHINGTON.—Secondary stocks of the four major oil fuels dropped 2,682,000 bbl. during November, marking the end of the seasonal buildup which began last May a month later than was the case in 1952 when inventories dropped 403,000 bbl. in October and 2,064,000 bbl. in November.

Inventories of gasoline, kerosine, and heating oils in the hands of jobbers and refiner-marketers dropped from 57,163,000 bbl. October 31 to 54,481,000 bbl. November 30, the Census Bureau reported last week. The latter total was about 2 per cent under the 55,406,000 bbl. held on November 30, 1952.

On a geographic basis, secondary inventories declined in PAD Districts 1, 2, and 3, but increased in Districts 4 and 5 where they were also above the comparable 1952 date. The heaviest decline was in District 1, where total stocks dropped 2,372,000 bbl. or close to 9 per cent during the month.

A Census Bureau survey of storage capacity in all districts except District 5 placed the total at 85,200,000 bbl. as of October 31, 1953.

SECONDARY INVENTORIES
(Thousands of barrels)

	Nov. 30, 1953	Oct. 31, 1953	Nov. 30, 1952
Gasoline:			
PAD 1	5,164	5,039	5,875
PAD 2	8,202	8,068	7,807
PAD 3	2,318	2,428	2,526
PAD 4	949	915	830
PAD 5	2,341	2,211	2,063
Total U. S.	18,974	18,661	19,101
Kerosine:			
PAD 1	3,157	3,536	3,349
PAD 2	3,444	3,569	3,664
PAD 3	599	596	678
PAD 4	87	87	93
PAD 5	96	103	105
Total U. S.	7,383	7,891	7,889
Distillate:			
PAD 1	11,819	13,055	12,049
PAD 2	6,579	6,953	6,795
PAD 3	844	946	1,177
PAD 4	504	513	493
PAD 5	1,554	1,214	1,304
Total U. S.	21,300	22,681	21,818
Residual:			
PAD 1	4,526	5,408	4,191
PAD 2	1,502	1,722	1,891
PAD 3	328	611	330
PAD 4	10	10	6
PAD 5	458	179	180
Total U. S.	6,824	7,930	6,598
Four products:			
PAD 1	24,666	27,038	25,464
PAD 2	19,727	20,312	20,157
PAD 3	4,089	4,581	4,711
PAD 4	1,550	1,525	1,422
PAD 5	4,449	3,707	3,652
Total U. S.	54,481	57,163	55,406

New Deep Field Discovered

HOUMA, La.—Deep-sand exploration in southeastern Louisiana has resulted in the discovery of another gas-condensate field, located 25 miles northwest of here in eastern Assumption Parish, near the Terrebonne parish line.

The new discovery well, drilled by M. L. Mayfield, of Houston, found production in a lower Miocene sand. Casing is perforated at 14,224-30 ft. with bottom of the hole at 14,500 ft. On completion tests, the well flowed at the rate of 2,500,000 cu. ft. of gas with an estimated 100 bbl. of 58.6°-gravity condensate per day. Flowing pressure gaged 4,500 psi.

Location is on the operator's Lutcher-Moore Lumber Co. lease in 70-16s-14e, which is approximately 4 miles west of Gibson and about 6 miles southwest of Chacahoula field.

Oil Management Rated Tops

NEW YORK.—The management of 14 oil companies during 1953 was certified as excellent last week by the American Institute of Management.

Of the 14 oil companies cited, 11 received the award for the fourth consecutive year. These were: Continental Oil Co. and Humble Oil & Refining Co., both of Houston; Ohio Oil Co., Findlay, Ohio; Gulf Oil Corp., Pittsburgh; Phillips Petroleum Co., Bartlesville, Okla.; Socony-Vacuum Oil Co., Inc., and Standard Oil Co. (N. J.), both of New York; Standard Oil Co. of California, San Francisco; Standard Oil Co. (Ind.), Chicago; Standard Oil Co. (Ohio), Cleveland; and Sun Oil Co., Philadelphia.

Creole Petroleum Corp., New York, was granted the designation for the second straight year. Amerada Petroleum Corp. and Shell Oil Co., both of New York, received their first award.

Lease Record Set

Aquila pays $433,251 for Alberta "moose pasture"

EDMONTON, Alta.—Aquila Petroleums, Ltd., wholly owned exploration subsidiary of Imperial Oil, Ltd., has paid $433,251 for a reservation of 99,840 acres 40 miles west of Alberta's promising Pembina oil field.

Although not a record per acre, this is the largest total amount ever paid for a single block of crown reserve wildcat acreage in Alberta.

It's a lot of money to pay for a piece of "moose pasture," an official of the provincial mines and minerals branch maintained. And moose pasture is just about what the reservation is. It is about 100 miles southwest of Edmonton in bush and muskeg country where the land starts to roll before it becomes the Rocky Mountain foothills proper. The only roads are lumber trails.

The Alberta Government is expected to receive more fancy prices for oil rights at its January 26 auction of crown reserves in Pembina field. This new field, about 65 miles southwest of Edmonton, has attracted widespread interest in both Canada and the United States.

Six wells already are on production, two others have discovered oil, and several others are drilling. The six producers already have outlined a potential field 6 to 8 miles long and 3 to 4½ miles wide.

First Cardium pay . . . Pembina field is the first in Alberta in which the Cardium sand has yielded oil in commercial quantity. Pay zone of the sand is 40 ft. thick. While this does not compare with the 140-ft. thickness of Redwater pay, Pembina porosity is 25 per cent compared with Redwater's 6 per cent.

At Pembina oil has been found in four sandstone formations: the Belly River, Cardium, Viking and Blairmore. The oil is 37° gravity.

Socony-Vacuum Exploration Co., Seaboard Oil Co. of Delaware, Honolulu Oil Corp., Merrill Petroleums, Ltd., and Cancoll Oil (Canadian Collieries) are the discoverers of Pembina. Socony is the major participant (50 per cent).

Application has been made to the Alberta Petroleum and Natural Gas Conservation Board for 80-acre instead of 40-acre spacing of Pembina wells, which is expected to cut development costs almost in half.

Highway Refinery Expanded

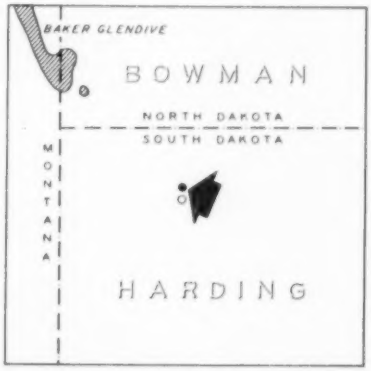
SASKATOON, Sask.—A 2,600-bbl. daily U.O.P. fluid cat cracker has been placed on stream here completing the addition of new facilities at the 5,000-bbl. refinery operated by Highway Refineries, Ltd.

The plant expansion project, contracted by Refinery Engineering, Ltd., included the addition of gas concentration and polymerization units and the revamping of the thermal cracker to a crude unit and vacuum visbreaker.

Canadian Firm Buys Alox

TORONTO, Ont.—A newly formed Canadian company, Surpass Petroleums, Ltd., has acquired controlling interest in the Alox Corp. of Niagara Falls, N. Y., and will build a plant near Toronto to produce a line of petrochemicals for lubricating oil additives, blending agents, inhibitors and protective coatings.

The company will equip a plant at Scarborough, Ontario, for the manufacture of oxygenated chemicals, lube additives and special high melting-point blending agents, from crude scale waxes, petrolatum and other petroleum fractions. With operations similar to those at the Alox Niagara Falls plant, the new installation will be the first in Canada to produce many of these specialty chemical products.



U. S. Adds 28th Oil State

South Dakota has joined the ranks of producing states as a result of this oil discovery in Harding County by Shell Oil Co. The well, Shell's 1 State "A," in SW SE 9-21-4e, has been put on pump. On its first 24-hour production test it made 135 bbl. of oil and 133 bbl. of water from 8,660-90 ft. in the Red River. The well has not yet been completed, and testing will continue. Success of the wildcat, however, is indicated by Shell's staking of an extension well ½ mile south of the discovery in C SW NE 16-21n-4e. Shell will get no bonus, however. A bill providing a lump-sum cash payment for the first commercial oil find in the state failed to get through the South Dakota Legislature.

Lube Plant Bids Invited

EDMONTON, Alta. — Imperial Oil, Ltd., has called for bids on the major portion of its $15,000,000 construction program at its refinery here.

The program includes building a modern solvent-extraction lubricating-oil plant with a daily capacity of 2,000 bbl. of finished products.

The project will not only be the first tube plant in Western Canada, but also second in size only to Imperial's Sarnia plant. The Sarnia plant is rated at 3,800 bbl. per day.

In addition to the solvent-extraction and other lube-processing units, existing facilities at Edmonton will be adapted to provide new feed stocks for the new plant. Construction will start this spring with completion due in 1955. The plant will make Imperial's western operations independent of eastern lubes except for some specialized oils produced at Sarnia.

Plant Expansion Starts Soon

CALGARY, Ont.—Engineering for the expansion of the Jumping Pound gas-processing plant of Shell Oil Co. of Canada has been completed and construction is expected to get under way in the near future.

Refinery Engineering, Ltd., Toronto, contractor on the project, last week opened a Calgary office under the supervision of Paul Smith to carry out the work.

The project will mark the second expansion of the plant in 2 years and will increase capacity to 70,000,000 cu. ft. a day—almost three times the original 25,000,000 cu. ft. capacity.

Imperial Posts Manitoba Price

CALGARY, Alta. — Imperial Oil, Ltd., last week posted its first price for Manitoba crude in a bulletin listing flat price of $2.70 a bbl. for Mississippian crude from the Daly field.

Roselea Well Completed

BRANDON, Man. — California Standard Co., Canadian subsidiary of Standard Oil Co. of California, has completed its first development well in Roselea field of southwestern Manitoba. The well flowed clean 35°-gravity crude at the rate of 2,017 bbl. daily from Mississippian at 2,123 ft.

Committee Filled

Nine-man group to study Oklahoma allowable setup

OKLAHOMA CITY, Okla.—Seven more individuals have been invited to serve on a general coordinating committee set up by Walker T. Pound, Oklahoma director of conservation, to overhaul the state's method of setting crude-production allowables.

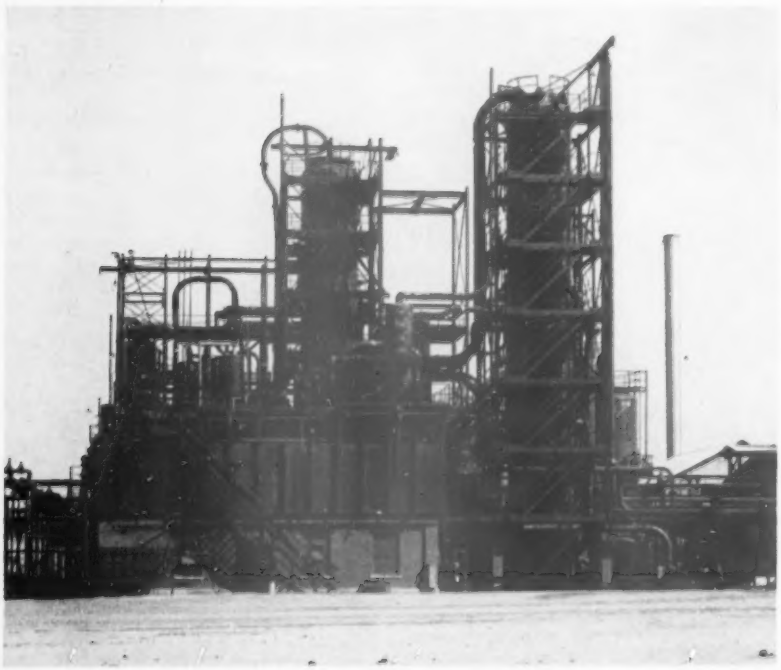
Organization of the committee, created at a conference January 11 between state conservation officials and nearly 150 operators and crude buyers *(The Oil and Gas Journal, January 18, page 52)*, now is complete. Heading the committee as cochairman are William T. Payne, president of Big Chief Drilling Co. and past president of the Mid-Continent Oil and Gas Association, and Roland V. Rodman, president of Anderson-Prichard Oil Corp. and of Western Petroleum Refiners Association.

The other newly announced members of the committee are: Ralph O. Dietler, Stanolind Crude Oil Purchasing Co.; L. J. Forche, Sinclair Oil & Gas Co.; George W. Selinger, Skelly Oil Co.; Ward Merrick, independent royalty owner; O. P. Nicola, Phillips Petroleum Co.; Max Pray, independent producer; and Lawrence Alley, public member and secretary of the committee.

Working subcommittees, according to Payne, Rodman, and Pound, will be appointed as they are needed.

Work under way . . . A subcommittee already is at work preparing a form on which producers will be required to list the location of all wells, their production, and other pertinent data. This form is expected to be adopted before the first of February, probably at the regular monthly allowable hearing of the committee this week.

The form will be distributed to all producers as soon as possible by crude purchasers and pipe-line companies. The industry will also assist in tabulating the information. With the production data in hand, steps will be taken to revise the proration method and subsequently the conservation department's entire set of rules and regulations.



Only This Unit Will Remain in Halifax Refinery

This combination crude and thermal cracking unit will be the sole survivor in the $30 million modernization and expansion program just announced for the 22,000-bbl. per day Imperoyal refinery near Halifax, Nova Scotia, by Imperial Oil, Ltd. The crude section, together with a battery of old batch stills, will be replaced by a new 41,625-bbl. per day atmospheric and vacuum unit, and the thermal cracking section will be completely revamped to conform to the requirements of the new refinery. The program also includes a new 27,000-bbl. per day fluid catalytic cracking unit of the Model IV type developed by the affiliated Standard Oil Development Co., and facilities for light ends recovery, polymerization, and treating. Construction will begin early next year, with completion scheduled for mid-1956.

Wide-Spacing Order Asked

OKLAHOMA CITY. — Proposed 160-acre spacing for Yellowstone pool —Oklahoma's most significant discovery in 1953—will be the subject of a hearing here February 2 before the Oklahoma Corporation Commission.

Request for 160-acre spacing for the Simpson and Arbuckle formations was made by Champlin Refining Co., which discovered the pool with its 1 Diamond. Yellowstone field is in Woods County and represents the first production in this general area of northwestern Oklahoma.

Nearest oil production is in Barber County, Kansas, and the nearest in Oklahoma is Ringwood field of Major County.

The new field now has three wells, with two more drilling and two more locations staked.

The discovery well was completed in the Arbuckle, flowing 86 bbl. of oil in 8 hours after acidizing between 6,134-40 ft. Three tests were made in the Simpson, each producing oil or distillate and gas.

Yellowstone pool last week was extended ½ mile to the southeast by Peppers Refining Co. at 1 Mayes in NE NE NE 20-29n-17w, which flowed an estimated 17,000 M.c.f. of gas per day from the Arbuckle. The gas flow was pinched to 3,000 M.c.f. per day and the well produced 17 bbl. of 72.6°-gravity distillate per million.

Unitization Order Upheld

OKLAHOMA CITY. — The Oklahoma Corporation Commission's order on division of oil production has been upheld by the state Supreme Court, settling a long battle over enlarging the unitized Elk City oil field.

The commission had ordered that the unitized field be enlarged from 7,520 to 8,200 acres and that the original formula for dividing oil production should be retained—on the basis of 50 per cent acreage and 50 per cent oil in place.

The court ruled the commission had the power to define the rights of owners of a common source of oil supply, and that the order does not deprive appealing royalty owners of their property without due process of law.

ROCKY MOUNTAIN

Plant Opening Set

North Dakota refinery will go on stream in mid-March

DICKINSON, N. D.—The 2,000-bbl. per day refinery of Queen City Oil & Refining Co. here is expected to go on stream during the middle of March, according to Chester A. Brooks, general manager.

The refinery will be the first to go on stream in the North Dakota portion of the Williston basin. Two other North Dakota refineries are currently under construction.

Williston Basin Refining Corp. is building a 1,500-bbl. per day refinery at Williston and Standard Oil Co. (Ind.) is building a 30,000-bbl. per day refinery at Mandan.

Completion of the thermal cracking unit at the refinery is scheduled for March 1 and the plant is slated to go on stream in the middle of the month.

The refinery is designed so capacity can be increased to 5,000-bbl. per day if required. Products will be sold within a 100-mile radius of Dickinson.

The plant is located on a 68-acre site west of Dickinson. Construction of the plant began last August.

Queen City's directors are William F. Hewett of Rushville, Neb., president; Dr. R. L. Hook of Rushville, vice president; William A. Hollstein of Rushville, secretary; Robert B. Baird of Dickinson, treasurer; and Brooks, general manager.

V. C. Burkhard is superintendent of the refinery; Irving Dana is assistant manager; and R. G. Bacon is assistant superintendent.

Crude supply . . . Crude oil for the refinery will be obtained from the nearest North Dakota producing wells, Brooks said, although it may have to be supplemented by eastern Montana crude.

He said Northern Pacific Railway Co. is building a spur track to the plant for tank-car shipment of crude. Storage tanks are being built by Pepper Tank Co. of Casper, Wyo.

Strike Extends Newcastle

DENVER.—A highly significant discovery, the 1-A Government - Maule, has extended Newcastle sand production to a north-south length of 29 miles along the Clareton-Black Thunder-Cheyenne River trend into Niobrara County, Wyoming.

A joint venture of Cosden Petroleum Co., R. L. Manning, and Wind River Oil Co., the well flowed at a rate of 350 bbl. of oil daily.

The well is about 4 miles south of production in Weston County, Wyoming, the most active area in the Rockies in 1953. Weston County had 260 wells completed in 1953, 215 of them oil wells.

The new discovery extends the trend southward. Its width is about 4 miles and has not been definitely established.

Tensleep Production Found

WORLAND, Wyo.—The first Tensleep production between the Manderson unit and Bonanza field has been found by L. H. Peterson's 2 Wycol-Government in Big Horn County, Wyoming.

The test is half a mile east of the South Manderson pool discovery, which flowed oil from the Phosphoria. The Peterson well found saturation in the Phosphoria but will complete the strike in the Tensleep, due to the difficulty of marketing the sour crude produced from the Phophoria in this area.

WEST COAST

Offshore Oil Royalty Sought

LOS ANGELES.—A plea that state laws be amended so that Seal Beach and possibly seashore communities will receive royalty from offshore oil operations was made here last week.

Appearing before the senate interim committee on oil and gas development, Capt. John R. McKinney, of the Seal Beach Naval Ammunition Depot, asked for a "reasonable royalty grant" and also that Seal Beach be given the power to locate offshore drilling islands as far seaward as possible.

McKinney said no provision has been made to reimburse Seal Beach for any beach pollution or other damage that might occur as a result of offshore oil operations. Oil companies, he said, will be afforded fire and police protection, without any corresponding income to the city.

Big Lease Offer Rejected

LONG BEACH, Calif.—A leasing offer by an unidentified oil company has been unanimously rejected by 400 owners of the 600-acre tract of private property within the city limits and adjacent to the prolific production in Wilmington field *(The Oil and Gas Journal, January 11, page 65).*

The oil company, working through the Los Angeles firm of Keans, Springmann & Stipek, offered a rental of $250 an acre annually and 25 per cent royalty for the leases.

Property - Owners Oil Development Association, made up of the property owners in the affected area, directed its board of directors to name a committee of five to draft a plan under which the owners would sign leases and turn them over to a bank or trust company. The plan will be presented to the association on February 5.

The association opposed the leasing offer on grounds that the compensation offered was inadequate and that larger offers will come later. An officer of the association said the unidentified company could later sell the leases at a profit to whatever firm gets the city's contract.

Drilling Program Announced

LONG BEACH.—From 30 to 35 wells will be drilled in Wilmington field during the first 6 months of this year for the Long Beach Harbor Department, according to Frank J. Hardesty, chief petroleum engineer for the department.

Hardesty said the department now has 912 oil wells drilled, of which 770 are producing. As of January 1, Long Beach Oil Development Co. had 662 producers, 73 idle wells, and 60 abandoned wells. Richfield Oil Corp. had 108 producers and 9 idle wells.

He said tests are being made as to the economic feasibility of drilling new wells on 5-acre spacing rather than the 10-acre spacing now in effect.

Long Beach Completes Tests

LONG BEACH, Calif. — Seismic tests of nearly 10,000 acres in San Pedro Bay here have been completed with results termed as "very satisfactory" by Dr. Manuel N. Mayuga, principal geologist for the Harbor Department and city representative on the survey.

About 700 ninety - pound charges were set off by Western Geophysical Co. to chart the area lying between the beach and the 3-mile limit and the east-west city limits. It is adjacent to the prolific Wilmington field.

The firm will compute the data and plot the maps during the next 6 to 9 weeks.

MEETINGS

Geologists Plan Meeting

ALBUQUERQUE, N. M.—Exploration frontiers of the Rocky Mountains will be the theme of the 3-day annual meeting of the Rocky Mountain section of the American Association of Petroleum Geologists starting here February 22.

Max L. Krueger, consulting geologist, Laramie, Wyo., and Robert O. Anderson, president of Malco Refineries, Inc., Roswell, N. M., will be the keynote speakers for the meeting, to be held in the Hilton Hotel.

A display of exploration equipment also will be featured, with R. E. Murphy, Magnolia Petroleum Co., Roswell, in charge.

Corrosion Course Plans Set

TULSA.—Practical control of pipeline corrosion will be the theme of the fifth annual short course in corrosion control to be held by the Tulsa section of the National Association of Corrosion Engineers February 17-19.

Sessions will be on a "how and why to do it" basis, and the right way of controlling pipe-line corrosion will be emphasized by showing some of the wrong ways of attacking it. A tour of a demonstration site near Tulsa also is on the program.

Speakers will include: Jack P. Barrett, Stanolind Oil & Gas Co.; Gaines Laster, Tulsa Pipe Coating, Inc.; John E. Search, Service Pipe Line Co.; W. P. McCollister, Phillips Petroleum Co.; A. L. Stenger, Tennessee Gas Transmission Co.; and Earl W. Owens, T. D. Williamson, Inc.

Headquarters will be in the Mayo Hotel.

Basin Oil Show Dates Set

ODESSA, Tex. — A "boom town" built along the lines of typical West Texas oil-field communities of the 1920's will be erected this year as a permanent feature of the Permian Basin Oil Show here October 14-17. The show is held here during Oil Progress week of even-numbered years.

Supply and service companies will furnish oil equipment to display in the boom town area which will be part of the over-all recognition the show will give to Permian basin old-timers.

Site of the show and exhibit will be the new Ector County Coliseum and Fair Park area, north of here, on which construction is expected to start early in February.

Better Communication Urged

STILLWATER, Okla. — Work will get done better and quicker if workers and management jointly make operating decisions, a large group of operating oil men and executives were told here last week in a management seminar conducted by Oklahoma A. & M. College.

Robert C. Hood, president of Ansul Chemical Co., manufacturer of industrial chemicals and fire-fighting equipment, said skill in communication is required at the management level to create an atmosphere of understanding. Communication within a company can be obtained by meetings, conferences, telephones, letters, employe publications, and supervisory bulletining. The skill with which they are used, he said, will be reflected in the productivity of each operating department.

The seminar was open to industry executives throughout the Mid-Continent. Of the total registration, however, 93 per cent was made up by oil-industry personnel.

SOME OF THE EQUIPMENT which will be sent to Alaska by Williams Brothers Co. for use in building the military products line is shown in Tulsa as it was assembled. The equipment will be shipped to New Orleans, where it will be loaded for water movement to Haines, Alaska. The shipment is scheduled to leave New Orleans in mid-February.

Alaskan Line Equipment Leaves in February

HAINES, Alaska.—The first shipload of equipment to be used on construction of the military's 610-mile, 8-in. products line from Haines to Fairbanks will leave New Orleans in mid-February.

Actual construction of the line is not expected to get under way before May because of adverse weather conditions throughout the winter months. Right-of-way is now being cleared by Oaks Construction Co., Anchorage, subcontractor, at two points on the line route. Crews are at work on both ends of the Fairbanks-Tok Junction segment of the right-of-way, a distance of about 200 miles.

The Fairbanks-to-Big Delta section of the line will be ditched and the remainder of the line to the Canadian border will be laid on the surface of the ground. The 44-mile section from the Canadian line to Haines will be ditched.

The Defense Department pipe line will be built under a contract awarded to Williams Brothers Co., Tulsa; McLoughlin, Inc., Great Falls, Mont., and Marwell Construction Co., Vancouver, B. C., on a joint bid of $29,001,287.50.

Phillips Review Set

Supreme Court changes mind, agrees to review decision which many say means FPC regulation of gas production

Bertram F. Linz

WASHINGTON. — In a spectacular reversal of its previous stand, the Supreme Court last week agreed to review the controversial "Phillips" natural-gas case.

The court gave no reason for its action—one of the rare instances in which it has reversed itself—in nullifying its refusal November 30 to review the decision of the District of Columbia Court of Appeals *(The Oil and Gas Journal, December 7, 1953, page 68)*. The appeals court decision reversed an order by the Federal Power Commission holding that Phillips Petroleum Co. was not subject because of its sales of gas to regulation under the Natural Gas Act.

At issue is whether a company which sells natural gas to interstate transmission lines at natural-gasoline plants is subject to FPC regulation.

The Supreme Court's action meant an initial victory, at least, in the fight to overturn the appeals court ruling, which the industry contends can be stretched by interpretation to bring all of the nation's estimated 2,300 natural-gas producers under FPC control.

Both the company and the commission asked that the Supreme Court reconsider its refusal. The court announced January 18 that it would review the case, and at the same time, said it would hear 1 hour of argument February 1 on whether to accept petitions filed by the states of Alabama and Rhode Island to determine the constitutionality of the 1953 act of Congress restoring to the states title to the submerged lands within their historic boundaries.

The two states—and Arkansas in a suit filed in the District of Columbia federal court—challenged the measure on the ground that the oil and other resources of the tidelands belong to all the states. They also raised questions as to the rights of other states in the fish and other reserves off the coasts of Louisiana and Texas. Rhode Island also raised a question of the possible effects of the affirmation of Texas' 3-league boundary on the right of American fishermen to work the Grand Banks, which lie within 3 leagues of Canadian territory.

Political issue eliminated . . . The court's decision to review the Phillips case was seen in Washington as eliminating what might have become a political issue in this year's congressional campaigns. Had its refusal to review stood, strong pressure would have been brought upon Congress to amend the Natural Gas Act to specifically exempt production and gathering. This would have been met by charges of "give-away" from the forces which initiated the litigation to upset the FPC ruling —the State of Wisconsin and the cities of Milwaukee, Detroit, and Kansas City.

At the same time, the revival of the case will leave the commission free from pressure to apply immediately the principles set forth in the court decision.

In its petition for reconsideration, Phillips said the court's original ruling served only to increase rather than dispel the "confused situation which has plagued the industry, the Federal Power Commission, state regulatory authorities and the public generally."

The company warned it must be expected the question would be raised before the court again and said that delay in settling the issue would have serious adverse effects upon both the industry and the consuming public.

A number of the gas-producing states also asked the court to reconsider its position.

Reaction to ruling . . . Texas Atty. Gen. John Shepperd, termed the court's decision to hear the case "the first ray of hope in recent years that the court may recognize states' rights in natural-gas production."

He saw in the decision indication for favorable court action on the Texas gas-gathering tax, now pending, and in the Northern Natural Gas Co. rate-fixing case. "All three decisions are intertwined since the fundamental question is may the states continue to regulate the gas industry or must they step aside for federal bureaucracy," he said.

In Bartlesville, Okla., K. S. Adams, board chairman of Phillips Petroleum, said "It is hoped that the decision by the Federal Power Commission in the Phillips case, which followed and reiterated numerous decisions since the enactment of the Natural Gas Act . . . will now be sustained."

Interior Budget Cut

Bureau of Mines, Geological Survey, FPC, FTC to get less, Bureau of Land Management more in fiscal 1955

WASHINGTON. — President Eisenhower last week recommended that Congress appropriate $26,300,000 for Interior Department work of interest to the oil and gas industry during the fiscal year beginning next July 1.

The total recommended in the President's 1955 budget is approximately $1,200,000 less than estimated expenditures during the current fiscal year.

The new budget makes provision for revival of the Oil and Gas Division as an agency in the secretary's office succeeding the Petroleum Administration for Defense. An appropriation of $300,000 is recommended, which will permit the employment of an average of 35 persons, comparing with $447,500 provided for operation of PAD for the current fiscal year.

The budget recommendation specifically provides that the OGD is to be reestablished to enable the secretary "to discharge his responsibilities with respect to oil and gas, including cooperation with the petroleum industry and state authorities in the production, processing, and utilization of petroleum and its products, and natural gas."

In addition to the fund for OGD the budget carries $150,000, the same as for the current year, for enforcement of the Connally Hot Oil Act. This year's fund is $37,000 less than recommended by President Truman in his budget last January, just before the change in administration.

For synthetic fuels . . . More than $4,000,000 is estimated as the cost of synthetic-liquid-fuel research in 1955, approximately $740,000 less than provided for this year, when the new administration lopped more than $3,000,-

000 off the Truman budget recommendation. The Bureau of Mines would be given $4,099,000 for laboratory research and demonstration, against $4,479,104 for the current year, and $75,318 for minor construction and alterations for laboratories and pilot plants, against $306,879 for 1954.

The bureau would also get $1,250,000 for its five research projects in oil and natural gas, its statistical and economic studies, and maintenance of its facilities, against $1,343,356 this year, and $90,000 for research in helium, against $90,975.

For federal lands management . . . An appropriation of $884,750, compared with $675,000 for the current year, was proposed for the lease and disposal of mineral resources by the Bureau of Land Management, it being explained the increase is necessitated by the greater number of applications for oil and gas leases that are being received and in anticipation of the granting of leases for development on the outer Continental Shelf.

For surveys and mapping . . . It is proposed to give the Geological Survey $5,460,000, compared with $6,444,040 this year, for its geologic and mineral-resources surveys and mapping and $12,290,000, compared with $12,733,390, for its topographic surveys and mapping. The bureau also would be given $410,000, the same as this year, for its work in classifying federal lands as to their mineral and water-power values, and $1,300,000 against $1,195,000, for supervision of mining and oil and gas leasing.

The bureau's leasing activities are more than self-supporting. It is estimated that in the current year about 120,000 leased properties in 32 states will produce oil, gas, and other minerals valued at $480,000,000. Royalties of about $44,000,000 will be collected, 37½ per cent of which will be returned to the states of production, 57½ per cent placed in the reclamation fund, and 10 per cent retained by the Treasury.

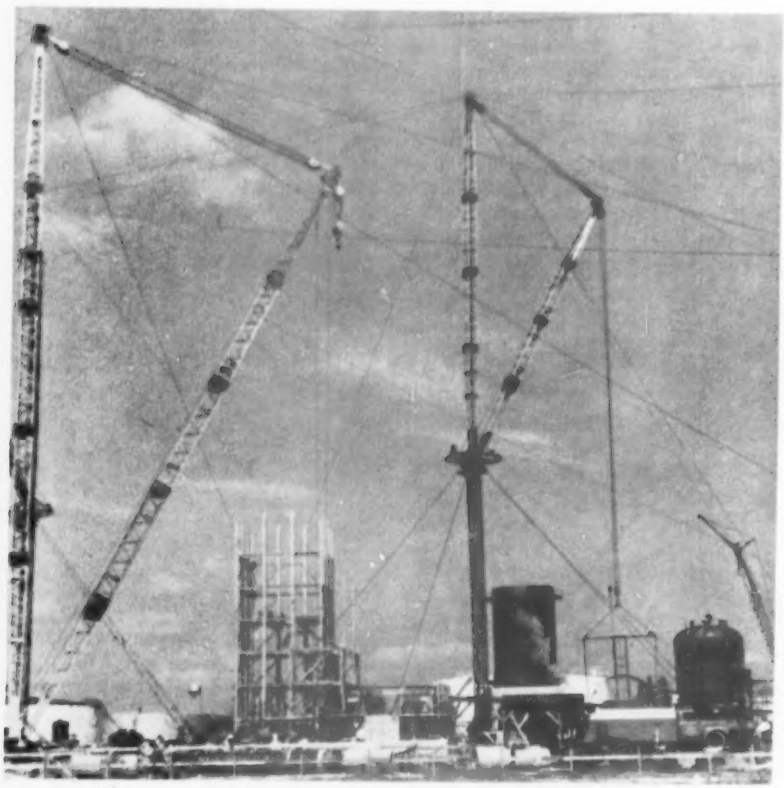
In fiscal 1955, it is estimated that the number of leased properties, mines and wells requiring supervision will approximate 130,000, and the production and royalty values are estimated at $525,000,000 and $48,000,000, respectively. In addition, increased development is anticipated in the outer Continental Shelf, where approximately 350 oil and gas leases producing about 2,000,000 bbl. of oil per year are being supervised at present.

For Navy oil reserves . . . An appropriation of $3,575,000 is proposed for use by the Navy Department in the administration of the naval petroleum reserves. The Truman budget estimated $13,150,000 for the current year of which $9,700,000 was for the Alaskan exploration program. With the scrapping of that program, funds previously appropriated for it, amounting to $2,699,000, were transferred for the administration of the other reserves and no further appropriation was made.

The fund proposed for 1955 is designed to finance a corrective program now under way to prevent the loss of oil in the shallow zone in the Elk Hills, Calif., reserve, the only one in which there is any activity. Reserve No. 2 (Buena Vista Hills, Calif.) is entirely under lease, and the exploration program in Reserve No. 3 (Teapot Dome, Wyo.) has been discontinued. The latter reserve, together with No. 4 in Alaska, has been placed in custodial status. Only minor surveys and custodial duties currently are being conducted in the oil-shale reserves.

For gas regulation . . . Under the budget, the Federal Power Commission is to get $1,680,209 for regulation and surveys of the natural-gas industry, compared with $1,771,000 for current year. The commission this year is supervising 170 natural-gas companies with an annual revenue of $3,400,000,000 compared with 160 companies with an annual revenue of $2,800,0000,000 in 1953.

For antitrust action . . . The Federal Trade Commission would be given $1,683,460, against $1,685,540 this year, for its antimonopoly investigations and litigation, and $855,750, against $927,840, for control of unfair trade practices. The Department of Justice would receive $3,100,000, against $3,150,000 this year, for enforcement of the antitrust laws.



Work Progresses on Shell's Norco Refinery Expansion

The boom at right is preparing to lift into place part of the catalyst hopper for a catalytic cracker at Shell Oil Co.'s Norco, La., refinery during work which will expand the refinery to 75,000 bbl. per day. The structure at left is being constructed for one of the other vessels of the catalytic cracker. A major part of the expansion at Norco has to do with a fluid catalytic cracker with a combined-feed capacity of 72,000 bbl. per day—possibly the largest ever built. Other expansion includes a new 30,000-bbl. per day crude distillation unit, a 31,000-bbl. per day vacuum flasher for catalytic cracker feed preparation, expansion of a butylene alkylation plant from 975 bbl. per day to 4,800 bbl. per day, expansion of a propylene polymerization plant to a 1,700 bbl. per day capacity, and additional boiler-house, wharf, and tankage facilities.

Reserve Bill Ready

Measure would cut lag in Navy's wartime oil output

WASHINGTON.—Legislation giving the Navy Department a free hand in the operation of the naval petroleum and oil-shale reserves in time of war has been introduced in Congress on the recommendation of the National Security Council.

Purpose of the bill, introduced by Sen. Leverett Saltonstall of Massachusetts, chairman of the Armed Services Committee, is to permit the Secretary of the Navy, with the President's approval, to expand production from the naval oil reserves and negotiate for the disposal of oil, gas, or other products without prior authorization of Congress.

Under existing law, the Secretary of the Navy must find that production is essential for national defense and obtain permission from Congress in the form of a joint resolution before the reserves can be produced. All production from the reserves, other than royalty oil and gas, must be disposed of at public sale. Contracts must be held up while the department confers with the Senate and House armed services committees.

These requirements, it was intimated by R. H. Fogler, acting Secretary of the Navy, in a letter requesting the legislation, slowed down expansion of output from the Elk Hills, Calif., reservation and the sale of products during the last war. The measure sought by the department would be effective only after Congress has declared a national emergency or a state of war, and operations in peacetime would be conducted as they now are.

Defeating the purposes . . . "This proposal has been recommended by the National Security Council which feels that delays arising out of restrictions in existing law would particularly impede the accomplishment of the planned objective of having Naval Petroleum Reserve No. 1 (Elk Hills), ready to produce at the onset of a major war or during a national emergency when production from this reserve might be imperative to the national defense," Fogler explained.

"The proposed bill would remedy this situation by giving the Secretary of the Navy authority, subject to the approval of the President, to initiate production from the petroleum reserves during a national emergency or state of war declared by the Congress, and also, during such periods, to negotiate sales of the products so produced. Congressional check would be retained by requiring a report to the armed services committees with respect to any such authorization of production and as to all details of any agreements made for the disposition of these products.

"It is to be noted that the legislation proposed would not relax any of the requirements as to public sale, consultation with the armed services committees, and approval of the President for contracts entered into by the Secretary of the Navy during peacetime, or when a national emergency or a state of war has not been declared by the Congress."

Pipe line proposal . . . The Navy also was reported preparing to follow up the request for a free hand in wartime production with a proposal to build a pipe line from the Elk Hills reserve to Los Angeles for emergency use.

The projected line would be about 100 miles in length. Its cost is estimated at approximately $8,000,000, using 14-in. pipe.

Major questions to be answered affirmatively before the armed services committees will approve the plan are whether the line would be adequate to move the more than 100,000 bbl. daily of crude that might be produced in all-out operations in Elk Hills and whether there is sufficient refining capacity in Los Angeles to handle it.

FTC Gets "Detroit Case"

WASHINGTON. — The so-called "Detroit case" of Standard Oil Co. (Ind.), was back in the hands of the Federal Trade Commission this week, following a finding by the Chicago Circuit Court of Appeals that it was without jurisdiction.

There was no immediate indication as to what the commission will do now, but there is a possibility it may reopen the case. The revised order issued by the commission after the Supreme Court affirmed the "good faith" defense is still outstanding, however, and the commission will either have to find a court to enforce it or issue a new order which the company will accept.

Oil Taxes May Top Billion

WASHINGTON. — The Treasury's 1953 revenue from the four federal oil taxes may top the billion-dollar mark for the first time, when all the figures are added up, but the increase over the $987,000,000 secured in 1952 will be slight.

This was indicated last week in an Internal Revenue Service report showing that collections for the first 11 months approximated $900,000,000 as compared with $902,000,000 in the same 1952 period.

The figures are not strictly comparable, however, because excise-tax reports now are filed on a quarterly rather than a monthly basis. The November 1953 figures, therefore, do not include the taxes accruing in the preceding month, whereas the November 1952 figures did.

The report showed that identified receipts for the first 11 months of 1953 included $791,767,000 from gasoline against $775,172,000 for the same 1952 period; $67,361,000 from lubricating oil against $85,350,000; $25,793,000 from pipe-line transportation against $28,573,000, and $15,223,000 from diesel oil against $13,223,000.

Tax Reforms Asked

Ike recommends sweeping revision of current laws

WASHINGTON.—Broad reforms in the federal tax laws were recommended to Congress last week by President Eisenhower.

The President indicated the administration has not made up its mind about what to do, if anything, about the oil industry's depletion allowance.

The "special problems of the oil and mining industries," the tax treatment of capital gains and losses, and the treatment of cooperatives, he said are still under study by the Treasury Department. Recommendations in those fields, he indicated, will be submitted later in the year.

While the President again asked that the reduction in corporation and excise taxes scheduled for April 1 be deferred for a year, he offered a number of recommendations which, if adopted, will benefit the oil and gas industry. These concern:

. . . Double taxation of dividends. Gradual removal, scheduled, starting with allowing stockholders a credit against their own income taxes of 5 per cent this year, 10 per cent in 1955, and 15 per cent beginning in 1956, with complete exemption of the first $50 of dividends this year and the first $100 in 1955 and thereafter.

. . . Depreciation. Liberalization recommended to reduce restrictions on new investment, by allowing larger depreciation charges in the early years of life of property by use of the declining-balance method of depreciation at rates double those permitted under the straight-line method.

. . . Research and development expenses. Give all companies an option

to capitalize or to write off currently their expenses arising from research and development work.

... Accumulation of earnings. Ease the burden on small companies by imposing on the Government the burden of proof that a retention of earnings is unreasonable.

... Taxation of partnerships. Should be simplified, and corporations with a small number of active stockholders should be given the option to be taxed as partnerships and certain partnerships be given the option to be taxed as corporations.

... Multiple corporations. Tighten the law to remove abuses from the use of multiple corporations in a single enterprise, but remove the penalty tax on consolidated returns and intercorporate dividends over a 3-year period.

... Income from foreign sources. Business income from foreign subsidiaries or from segregated foreign branches which operate and elect to be taxed as subsidiaries should be taxed at a rate 14 points lower than the regular corporate rate on earnings after January 1, 1954. The present definition of foreign taxes which may be credited against U. S. income tax should be broadened to include certain foreign taxes. The over-all limitation on foreign tax credits should be removed.

... Corporation-tax payments. A start should be made during the fall of 1955 toward smoothing out payments by requiring advance payments in September and December, on an "estimate of income" basis similar to that required of individuals. Each payment would be 5 per cent of the amount due for the entire year in 1955, rising to 25 per cent each in 1959.

U. S. Tanker Capacity Up

WASHINGTON. — The number of tankers in the active ocean-going United States merchant fleet remained unchanged through 1953, but the total capacity increased by approximately 100,000 deadweight tons, the Maritime Administration reported last week.

As of January 1, there were 443 privately-owned and 3 government-owned tankers in active service and 12 in the reserve fleet, the same as at the beginning of 1953, but the tonnage had increased from approximately 6,815,000 to something over 6,900,000 tons.

The administration's records showed that 22 new tankers were delivered in 1953 and 28 were building or on order on January 1, 1954.

WATCHING WASHINGTON

Bertram F. Linz

More Investigations

The House commerce committee may—and probably will—hold some hearings on oil before the end of the session, but how soon they will be called and how intensive an investigation may be made will depend on the price situation.

Right now, Chairman Charles A. Wolverton of New Jersey is intensely interested in an investigation of medical research and group hospitalization to the exclusion of everything else. He is holding hearings which will run into next month and which he insists should be attended by all members of the committee.

The committee has no plans whatever to follow the health investigation. Several members made trips abroad, Wolverton going to the Middle East and others to Venezuela, but it is planned merely to write reports on what was learned during those visits without holding any hearings.

There are no investigations hanging over from last year except that on prices, on which hearings were held last summer. A spokesman for the committee said there have been no suggestions to resume those hearings. He added, however, that the committee is "very sensitive" on the subject and a 1-cent a gallon increase in gasoline prices probably would be enough to set it off again.

Line Threat Voided

Applications for accelerated amortization of natural-gas pipe-line projects have picked up considerably since the Federal Power Commission announced last month that the tax benefits would not be held against the companies in the setting of rates.

Pipe-line companies were concerned for a long time over the strong pressures that had been brought upon the commission to pass the tax benefits along to consumers in the shape of lower rates during the 5-year period of rapid amortization.

Consumer representatives argued that to permit the companies to maintain their rates would require consumers to pay more than a fair return for utility services and give to the companies returns in excess of those necessary to render adequate service and attract capital for proper expansion of facilities.

The companies contended that if the FPC reduced rates merely because of the issuance of amortization certificates it would remove the incentive to secure quick write-off for the new projects.

The question was a knotty one but the commission finally held it would continue to relate the annual depreciation charge to the service life of the facilities on the ground that deferred taxes are not depreciation and should not arbitrarily be so labeled.

New Fuel Conflict

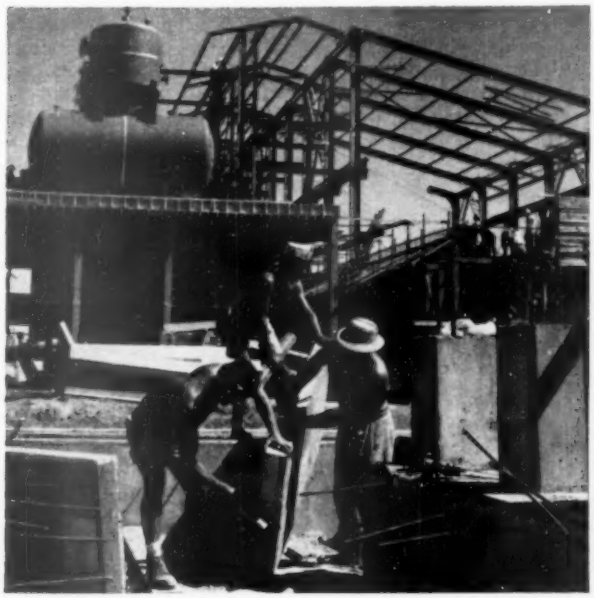
If the Government or the gas industry ever gets down to considering actual construction of a Gulf Coast-Eastern Seaboard natural-gas defense pipe line, the coal industry can be depended upon to put up vigorous opposition.

The coal operators are expected shortly to unleash a drive for enactment of legislation controlling the end use of natural gas, with a view to halting the burning of gas under boilers—which they now consider a much more serious source of competition than the imports of residual fuel oil which they have been fighting for some years.

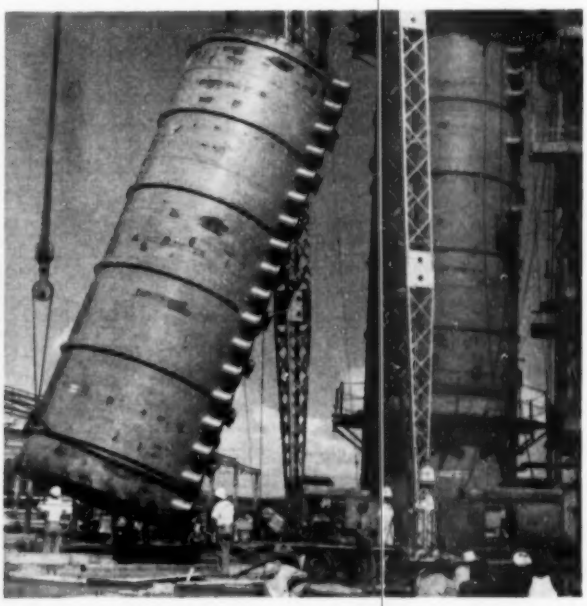
Since the proposed defense pipe line would have to operate exclusively on a wholly interruptible basis so that it could quickly be converted to oil in the event of war, its customers would buy the gas almost entirely for fuel. In other words, the gas line would offer the stiffest competition to coal that has yet developed.

The coal industry naturally could be expected to oppose the project, on the ground the line would take a substantial slice of its business in time of peace, with consequent distress to some mines and probably a reduction in employment of miners, yet paradoxically leave it with the responsibility of immediately filling the fuel gap in the event of war.

So far the coal operators haven't said much about the government's proposal, because at first it was directed at oil and there is no indication yet that the gas industry will support the idea. If the plan jells, however, they will have plenty to say.



POWER HOUSE under construction with deaerator tanks in the background.



40-TON CENTER section of a crude distillation unit moves into position.

Construction on schedule for . . .

. . . World's Biggest Refinery Job

Dahl M. Duff

CONSTRUCTION work on the 120,000-bbl. daily refinery of Anglo-Iranian Oil Co., Ltd., at Aden is moving ahead on schedule toward the anticipated commencement of operations in December.

The project is the largest completely new refinery now being built in the world. Facilities under construction include two main distillation units each of approximately 60,000-bbl. stream-day capacity, a 12,000-bbl. daily stream-day Platforming unit, treating plants, power station, and associated pipe-line, harbor terminal, and housing projects.

During the first year of construction, the site of the refinery has been changed from an arid, sandy waste into a scene of extensive building activity. Most of the towers of the distillation units have been erected, the SO_2 plant is half completed, tank construction has started, and foundations for the power station are nearly finished.

Accommodations for 2,500 British, American, and European technicians and 10,000 local and Indian workers have been built, along with recreation halls, open-air theaters, bakery, butchery, laundry, and police and fire stations.

Construction figure . . . At the oil port, 2,500,000 cubic yards of sand have been dredged and pumped ashore in the reclamation area. Nearly 1,000,000 cubic yards of rock have been quarried from the hills surrounding the site for construction of the breakwater, which now extends 3,700 ft. into the sea. Total length will be 4,000 ft. Piling of the first of the jetties is well advanced.

The entire refinery project entails a capital outlay equivalent to some $126,000,000. Contractors for Anglo-Iranian is a consortium of Middle East Bechtel Corp. and George Wimpey & Co., Ltd., for the refinery; the Wimpey company is building the port. When the refinery goes on stream, a permanent operating force consisting of about 250 British and 1,500 Arabs and Indians will take over from the construction staff.

The refinery's power requirements will total 22,500 kw.; water, 4,000,000 gal. per hour; and steam, 600,000 lb. per hour. Facilities being built at the Aden oil harbor will accommodate tankers of up to 32,000 tons. A substantial part of the Aden refinery's production will consist of fuel oil to be used for ship bunkering at this important port.

Personnel . . . General manager of Aden Petroleum Refinery, Ltd., the Anglo-Iranian subsidiary formed to build and operate the refinery, is A. W. G. Trantor, previously works manager of Anglo-Iranian's Kent refinery in England and who for a time was chief engineer at the Abadan refinery.

Resident engineer for Anglo-Iranian is R. Hedley Shelldrake, a member of the reconnaissance party which chose the Aden site and who has had considerable engineering experience with the company.

Middle East Bechtel is represented by J. F. Brady, vice president of Bechtel International Corp. who has been connected with refinery construction in the United States and Alaska, and F. Brown, project manager. A. Coutts is project manager of the oil port for George Wimpey & Co., Ltd., and P. Hogan is deputy project manager.

Sicily Well Tested

Gulf plans to undertake second test near Ragusa

GULF OIL CORP. has begun production tests in its wildcat near Ragusa in southeastern Sicily.

Several months ago, the company tested heavy oil of about 29° gravity at around 6,200 ft. Further drilling was then carried out on the possibility of finding deeper production.

After thorough tests of the well, the rig will be moved about ½ mile to another location and a second test undertaken. The area is a part of the concession holdings of American International Fuel & Petroleum Co., a wholly owned Gulf subsidiary.

The Gulf well is one of several under way on the island. D'Arcy Exploration Co., Ltd., was last reported drilling at about 4,000 ft. in its wildcat near Vittorio in southern Sicily. The Pacific Western-Wrightsman test in Sicily has run into mechanical trouble. The Italian state company, Azienda Generale Italiana Petroli (A.G.I.P.) is reported to be drilling this well.

Exploration boom . . . Sicily is now experiencing an oil exploration boom in which a number of Italian companies and several foreign operators are participating. Italy's own oil law discourages work by foreign companies, but the 1950 Sicilian law, passed under regional autonomy, opened the island to exploration by either foreign or Italian organizations. A.G.I.P. is now seeking to establish an acreage position in Sicily.

Besides Gulf, Anglo-Iranian, and the Pacific Western Oil Corp.-Charles B. Wrightsman interests, Macmillan Petroleum Corp. has been interested in Sicily for a number of years and now holds acreage in its own right as well as jointly with Gulf through Mediterranean Oil Co. It also was recently reported that the Southwest independents, M. B. Rudman and William G. Helis, were making plans to enter exploration in Sicily as well as Italy.

Concessions . . . Firms and acreage on which concessions have been granted include American International Fuel & Petroleum Co., 196,197 acres; D'Arcy Exploration Co., Ltd., two concessions totalling 200,094 acres; Mediterranean Oil Co., three concessions totalling 218,985 acres; Macmillan Petroleum Corp., 29,615 acres; Raffinerie Sicilane Oli Minerali, S.A., three concessions, 213,137 acres; Dr. Leonardi, 95,904 acres; Spadaccino, 13,306 acres; Soc. Snia-Viscosa, 104,560 acres, and Ing. Fenzi, 18,490 acres.

Raffinerie Sicilane, "Rasiom," operates a 13,000-bbl. daily refinery at Augusta, Sicily. Soc. Snia-Viscosa is an Italian silk manufacturer.

In addition to these grants, 30 different concession applications for a total of 857,687 acres are being considered by the Sicilian Government. These include large blocks sought by D'Arcy, Mediterranean Oil, Charles B. Wrightsman, Pacific Western Oil and A.G.I.P.

Iranian Rule Near

Justice to decide on U. S. firms' role in moving oil

THE U. S. Department of Justice is expected to decide within the next few days the extent to which American oil companies can participate with foreign companies in a joint venture to return Iranian oil to the world market.

The department's decision, which will be passed on immediately to the State Department and the companies, is expected to clear the way for the making of marketing or other arrangements that will become necessary when an agreement is reached between the British and Iranian governments.

It was predicted in Washington this week that such agreement will be reached in the near future and the first Iranian oil may begin to move by June.

Herbert Hoover, Jr., who, as special adviser to the secretary of state, acted as intermediary in the effort to get the British and Iranians together, has returned to Washington and is preparing a detailed report on his work.

Earlier this month, company executives met with State Department officials and reportedly were pressed to play a part in restoring the flow of Iranian oil even though it meant cutting back production in some other foreign areas. Reports to Washington indicate also that other Middle East oil-producing countries are willing to approve adjustments in production as an aid to oil peace in Iran which will strengthen the barrier against communism.

There was no indication as to the form of "clearance" that might be given by the Justice Department, nor how limited the participation of the American companies might be. The problems involved in the Iranian issue are not confined to marketing, but include questions of production and refining.

No State-Justice conflict . . . Contrary to the belief in some oil circles, there has been no real controversy between the State and Justice departments over the participation of the American companies in any plan to put Iran's oil industry back into operation. Differences of opinion have been related to the scope of American company activities in that effort.

Atty. Gen. Herbert Brownell, Jr., is represented as having been fully briefed on the vital need for American assistance if the Iranian issue is to be formally settled and as recognizing that need. At the same time he is said to have pointed out that the department must enforce the antitrust laws, and any arrangement given approval must be within the framework of those statutes.

First McCarthy Test Due

Glenn McCarthy, Houston operator, is scheduled to begin drilling the first well on his 970,000-acre Bolivian concession near the end of January.

McCarthy arrived in La Paz earlier this month with George Underwood, geologist for Glenn McCarthy, Inc., the public stock company which controls the operation. McCarthy said much of the equipment is already in the area, and that headquarters would be set up at Yacuiba, about 65 miles from the well location.

McCarthy's activities represent the first exploratory drilling by a foreign organization in Bolivia since the early 30's. His concession, granted under a final agreement of last May, covers two areas, Los Menos and Agua Salada, in Gran Chaco Province in the southeastern part of the country *(The Oil and Gas Journal, November 30, page 51)*. Under terms of the contract, he is committed to begin drilling in Los Monos within 3 months after arrival of the equipment. Another obligation requires that additional equipment capable of drilling three wells in the Agua Salada area to 10,000 ft. be shipped before May 26.

Antitrust Changes Asked

The theory that the antitrust laws should be restricted to domestic and export trade but not applied to operations of American oil companies in foreign countries was laid before the U. S. Attorney General's committee studying antitrust laws last week by Standard Oil Co. (N.J.).

In a lengthy statement filed with the committee, the company emphasized it was not presenting its views as a defense against the so-called cartel suit now pending in New York. The statement was designed to demonstrate the undesirability of attempting to control foreign operations through the antitrust statutes, raising the danger of

running into conflict with foreign laws, policies, and practices.

Any abuses arising in foreign operations should be dealt with by international law and the laws of foreign countries should be recognized, the committee was told.

Restrictions on foreign operations imposed by U. S. courts will not change the complexion of the oil industry abroad, the company said, but will merely handicap American companies while leaving foreign companies free to continue the practices attacked here. The eventual result, it was warned, might be the loss of foreign concessions.

New Oil Law Ready

Turkish parliament expects to "denationalize" industry

THE Turkish oil "denationalization" bill which opens up the country to foreign-financed exploration has been introduced in parliament amid indications of early passage.

Reports in the industry are that the measure is expected to be enacted into law before the state visit of the Turkish president, Celal Bayar, to the United States the latter part of January.

The new oil law offers oil concessions on favorable terms. In a ministerial declaration the latter part of 1952, the Turkish Government declared the results of 19 years of exclusive state operations in petroleum exploration and development had been unsatisfactory, and that foreign companies would be invited to participate in the industry.

One interesting feature of the law introduced to implement this change of policy is a call for the formation of a public stock company to take over the proved oil-producing areas in Turkey. These consist of two fields, Ramandag and Garzan, both of which were discovered by the government's M.T.A. Institute and which now produce several hundred barrels daily.

Geological work . . . A number of large foreign companies are already doing preliminary geological reconnaissance work in Turkey under letters of authorization issued by the government. Geological opinions on Turkey's prospects differ and some feel that only relatively small production, which would be taken in the domestic market, is likely to be found. However, considerable activity including geophysics and drilling is expected to result from passage of the new law.

Companies now doing preliminary geological work in Turkey include Socony-Vacuum Oil Co., Inc., Caltex, Conorado Petroleum Corp., Standard Oil Co. (N. J.), Royal Dutch-Shell, Cities Service Co., and most recently Gulf Oil Corp.

The law was drafted with the assistance of Max Ball, Washington consultant, and after study of the petroleum legislation in a number of leading oil countries, including Canada and several in South America.

The measure introduced in the Grand National Assembly incorporates 140 articles. The country was originally divided in eight districts but it is understood the latter draft calls for 12 districts. In each of these, any one company can hold 400,000 hectares, or approximately 1,000,000 acres.

Terms of law . . . Terms of the measure also contain a 50 per cent ceiling on the government's total "take" from any oil operation in all forms of taxes, royalty, etc. Overlaps resulting from the initial concession applications are to be decided by the government at its discretion. The basic royalty is 12 per cent with 50-year exploration leases.

Petroleum activity in Turkey also is given encouragement by the terms of a bill approved by the government which is designed to remove obstacles to foreign investment generally. The measure replaces a 1951 law which allowed only about 10 per cent of earnings to be taken out of Turkey.

The new foreign investments law provides for the opening of every field of productive activity to foreign capital, guarantees equal treatment for domestic and foreign capital and enterprise, allows the immediate and unlimited transfer of earnings and initial

Second Well in India's Second Field

This is the No. 2 well now drilling in the Nahorkatiya discovery area in Northeast India. Assam Oil Co., Ltd., a subsidiary of Burmah Oil Co., Ltd., brought in the Nahorkatiya discovery last year after extensive tests. Reports in industry circles are that the well tested about 500 bbl. daily from depths around 9,700 ft. The only other producing area in India is the Assam company's Digboi field situated about 20 miles to the northeast. Encouraged by the Nahorkatiya success, the Assam company has launched an expanded geophysical program for the winter season. In an area of some 5,000 sq. miles of the alluvial plain of the Brahmaputra Valley, aerial magnetometer, gravity, and reflection seismograph work is being carried out. To facilitate the seismic survey work, the company is making its first use of helicopters, one of which is shown in this view.

capital at the opinion of the investor along with reinvestment of earnings. The government also is modifying the existing provisions of the Turkish Commercial Code regarding formation and operation of companies, in an effort to facilitate foreign investments and make their operation as easy as possible.

Program Expanding

Three more wells planned for '54 by West Australian

THE West Australian Petroleum, Pty., Ltd., plans to spent at least $4,000,000 and drill three more wells during 1954 on the Western Australia acreage that gave the continent its first oil discovery late in November.

The Rough Range discovery well will be deepened in search of additional production and a second well is planned on the structure to confirm and evaluate the discovery. Also planned are an exploratory test on the much larger Cape Range structure to the northwest and a new wildcat in the Fitzroy basin in the northern part of the state inland from Derby.

This is understood to be a minimum program which might easily be stepped up during the course of the year. A second rig is expected to be used for the Fitzroy test. The 1954 plans of the company will result in trebling the existing field organization and greatly increasing the technical and general staff. In outlining its program to the Western Australia mines minister, the company said it already had spent the equivalent of about $4,000,000, most of it in 1952 and 1953. The minister said the proposed 1954 program fully satisfied the requirements of his department.

Discovery well . . . The Rough Range discovery well is now reported to be drilling at around 6,000 ft. with no further shows of oil. The company is prepared to take the hole to the originally projected depth of 10,000-12,000 ft. if necessary. The test was spudded last September 5 and tested around 550 bbl. daily of light and very waxy crude from a 15-ft. section below 3,600 ft.

The Western Australia discovery has given new life to oil exploration elsewhere in the country, and several other programs are in the early stages of financing and planning. Broken Hill Co., Pty., Ltd., recently announced plans to increase its capital to intensify exploratory work. At Perth, a new all-Australian company was being formed by a group of businessmen, brokers, and mining industrialists to carry out exploration for oil in three Australian states and possibly in New Guinea. The group has applied for permits covering several areas of Western Australia with initial emphasis on the Hamersley Ranges in the north, according to a report from Perth.

The Queensland Government granted permits to four companies for exploratory operations over large areas of that state. Two of the companies are Associated Australian Oilfields which will work in northern Queensland, and Frome Broken Hill, Pty., Ltd., which will investigate the western half of Cape York Peninsula and the Gulf of Carpentaria. The other two companies will be formed to explore West Central and Central Queensland.

Creole November Output Up

Operated production of Creole Petroleum Corp., leading producer in Venezuela, rose 75,558 bbl. daily in November to reach an average of 800,867 bbl. daily.

Of the total, 670,604 bbl. daily came from the Lake Maracaibo area 6,738 bbl. daily from other western Venezuela fields, and 123,525 bbl. daily from eastern Venezuela. The company's net production plus purchased royalty oil amounted to 857,569 bbl. daily.

During the month, Creole refined 62,343 bbl. daily at Caripito and 77,169 bbl. daily at Amuay.

Average rigs in operation by Creole dropped from 20.5 in October to 17.4 in November. The company completed 10 exploration wells, half of them dry. The deep Alturitas test which went to 17,173 ft. was finally marked off as dry. Successful exploratory wells in November were: two in the Maracaibo area, good for an average of 1,081 bbl. daily; one in San Joaquin, initial production, 747 bbl. daily, and two in Motatán, average initial production 1,083 bbl. daily at a depth of nearly 11,000 ft.

Shell Opens Amsterdam Lab

A new laboratory specially designed for fundamental research has been officially opened on the site of Royal Dutch - Shell's laboratory in Amsterdam.

The new laboratory provides those engaged in fundamental research with opportunities of working in close cooperation and also with the most up-to-date instruments and apparatus. Subjects to be studied include reaction kinetics, catalysis, structure of materials, and colloid chemical and viscosity problems. The most modern equipment has been installed for emission and absorption spectrometry.

Facilities include two mass spectrometers and an electron microscope of a new type, while a large electronic computer will be installed during the course of the year. Special studies are being made in the field of physical and organic chemistry to gain a better understanding of the processes for the conversion of crude oil into finished products. The field electron microscope used in the study of catalytic reactions has a magnifying power of over a million.

The new electronic calculating machine will take over much of the statistical work in dealing with experimental results as well as with theoretical studies and also will open many opportunities of solving problems which up to now have had to be shelved as being too elaborate.

Second Lifting Due

Tide Water will buy second tanker of Neutral Zone oil

THE Tide Water Associated Oil Co. expects to buy the Neutral Zone's second tanker of Wafra crude, due for lifting about January 27.

The shipment will be the first tanker of Pacific Western Oil Corp.'s share of Wafra production. Pacific Western and American Independent Oil Co. will alternate liftings. The first Aminoil lifting early this month went to Japan.

The disclosure last week by H. Y. Hyde, Tide Water vice president, confirmed industry speculation that Tide Water would probably take at least some of Pacific Western's share of Neutral Zone crude for refining on the West Coast of the United States. *(The Oil and Gas Journal, December 21, page 101).*

Controlling interest in Tide Water is owned by Pacific Western and Mission Development Co., both J. Paul Getty enterprises.

The first 100,000-bbl. lifting of Wafra crude was sold by Aminoil to Asano Busan, Japanese crude and products brokers, for Daikyo Oil Co.'s 14,000-bbl. refinery at Yokkaichi, between Tokyo and Osaka.

Aminoil, operator of the field, is aggressively developing markets for its share of Neutral Zone crude, Ralph K. Davies, president, said.

Many refineries heretofore dependent upon major companies have expressed interest in the Middle East crude, Davies said.

Aminoil's Wafra field crude now comes from five wells capable of producing in excess of 15,000 bbl. daily. Two rigs now are drilling development

wells, and production is expected to be substantially increased during 1954, with individual wells producing from 1,500 to 4,500 bbl. daily.

Crude is shipped from Aminoil's new Persian Gulf terminal, known as Mina Abdulla in honor of the present ruler of Kuwait. There is now 145,000 bbl. of storage and a 2-mile submarine loading line at the terminal. Additional tankage is under construction.

Engineering, design, and supervision of the surface facilities was handled by Carroll E. Bradberry & Associates, Los Altos, Calif. The major part of the field construction work was contracted to Construction & Trading Co., Beirut, Lebanon.

Pacific Western Oil Corp. holds an undivided half interest in the Neutral Zone operation.

U.S. Investment Up

American money in foreign oil may top five billion

TOTAL investment of American companies in foreign oil operations approached and maybe crossed the 5-billion-dollar mark in 1953.

The Department of Commerce estimated last week that the book value of foreign branches and subsidiaries of all American companies exceeded $16,000,000,000 at the close of 1953, an increase of approximately $1,200,000,000 during the year.

The department made no estimate of the part of this total attributable to petroleum, but figured the investment in oil at the close of 1952 at $4,291,000,000 and pointed out that several factors indicated a substantial increase during the past year.

Western Hemisphere gains . . . Particularly noted were recent large investments in Latin America and Canada, where basic exploration and development of producing properties as well as additions to pipe lines and other facilities is still going on; the "new complex" of refineries under construction in Africa and the Far East, and the development of new reserves in Australia.

The $4,291,000,000 investment in petroleum operations in 1952 represented an increase of $901,000,000 over the $3,390,000,000 estimated in 1950 which was approximately one-third of the increase in all direct investment from $11,788,000,000 to $14,819,000,000.

The investment in various areas, compared with 1950, was reported by the department as follows:

Canada, $715,000,000 against $418,000,000; Latin American republics, $1,577,000,000 against $1,408,000,000; western Europe, $532,000,000 against $424,000,000; all other areas, $1,467,000,000 against $1,140,000,000.

British Lube Output Rising

British refineries of Anglo-Iranian Oil Co., Ltd., will soon be producing lubricating oils at a volume amounting to more than a third of the company's demand.

The company said the increased production of lubricants would result in a substantial savings of dollar exchange since at least 40 per cent of Britain's present annual consumption of about 4,900,000 bbl. comes from the United States.

The Llandarcy refinery has recently stepped up its lube output from 350,000 bbl. to 700,000 bbl. annually, and lube units to be commissioned later this year at the Isle of Grain refinery will add another 980,000 bbl. annual capacity. Some of this production will be sold within the sterling area outside Britain.

Amazon Test No Discovery

Further details on the Nova Olinda wildcat of Conselho Nacional do Petroleo in the Amazon basin of Brazil show that earlier reports of a discovery at this location were erroneous.

Some oil-stained siltstone was cored in the well which is located on the right bank of the Madiera River, a tributary of the Amazon, about 125 km., or 78 miles, southeast of Manaos. *(The Oil and Gas Journal, January 18, page 72.)*

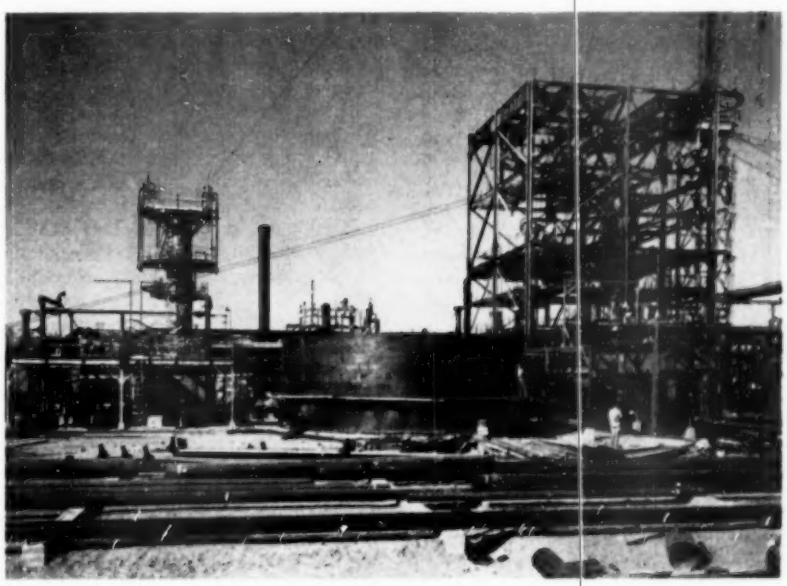
These shows were magnified by the local press into a large "discovery." A few centimeters of oil-stained siltstone were cored at a depth of 949 m., 971 m., and 987 m. (about 3,110-3,240 ft.) in sediments of Carboniferous age. The shows were not sufficient to warrant testing.

The well is being drilled ahead, last reported at a depth of 1,227 m. (about 4,000 ft.) on January 3.

Colombia Has New Plants

Two new processing facilities, a gasoline plant and a small refinery, are to be inaugurated in January by Colombian Petroleum Co. in the Barco concession in eastern Colombia.

The modern topping plant costing around $3,000,000 will have a capacity of about 2,200 bbl. daily and is located in Petrolea field. The gasoline plant is designed to handle 60,000,000 cu. ft. daily with a recovery of about 2,200 bbl. daily of light fractions. It was built at a cost of about $5,000,000.



African Synthetic Fuels Plant Under Way

The largest project for the synthetic production of liquid hydrocarbons now under construction in the Western World is the coal-to-oil plant of South African Coal, Oil & Gas Corp., Ltd., (SASOL) at Coalbrook in the Orange Free State about 40 miles south of Johannesburg. Cost of the project may reach as much as £30,000,000 (about $85,000,000). The economics of the operation rest on availability of cheap, easily mined coal. M. W. Kellogg Co. has the contract for the facilities. Shown here are the partially completed catalyst preparation and Synthol plant sections.

Refining Executive

Hyde assumes top post in Tide Water manufacturing

SINCE receiving his master's degree in chemical engineering at Massachusetts Institute of Technology in 1928, Herschel Y. Hyde evidently has had two things in mind: To work for Tide Water Associated Oil Co. and to live in the San Francisco Bay area.

If such were the case Hyde, new vice president in charge of the manufacturing activities of all divisions, has been highly successful. In January 1928 he started work for Tide Water as a research chemist at its Avon refinery. He has been with the company ever since—and at Avon except since 1946, when he moved to Berkeley.

Until recently he was vice president in charge of western division manufacturing, a position he had held since 1946. Henceforth he will devote his time and effort to planning, control and coordination of all Tide Water's manufacturing activities, including research.

Hyde was born at Stockton, about 55 miles east of the bay, and attended the University of California, at Berkeley. There he received his B.S. degree in 1926. After joining Tide Water, Hyde became general supervisor of the research and development department for the western division manufacturing department in 1929.

A member of the Stock Exchange Club and Commonwealth Club, at San Francisco, and of the Petroleum Club at Los Angeles, Hyde also spends much time at the Berkeley Tennis Club. There he has been active in the junior development program. Tennis has been his chief hobby for years, a sport in which he earlier won top-flight honors in amateur competition.

E. B. Harry has been promoted by Sohio Petroleum Co. from junior engineer to engineer in charge of the Oklahoma and North Texas district, headquartered at Pauls Valley, Okla.

Ralph Troseth, Midland, Tex., assistant general manager of Texas-New Mexico Pipe Line Co., has been elected to the firm's board of directors. He has been with the company since 1937.

John F. Hardy, a former production executive with the Benedum-Trees organization, Pittsburgh, has been named general manager of Central Oils, Ltd., with headquarters in Calgary, Alta.

W. C. Norman has been elected president of Colorado Oil & Gas Corp., Denver, formerly a wholly owned subsidiary of Colorado Interstate Gas Co. He replaces **Robert W. Hendee,** who resigned as president of Colorado Oil and Colorado Interstate, effective January 1. Norman is a former vice president of Tennessee Gas Transmission Co., Houston, and also was president of Northeastern Gas Transmission Co., a subsidiary of Tennessee Gas. He also has been with Union Sulphur & Oil Corp., and the gas division of The Chicago Corp., Corpus Christi, Tex.

R. B. YOUNG

Raymond B. Young has been appointed general manager of Esso Standard S.A.F., Paris, French affiliate of Standard Oil Co. (N. J.). He went to France in 1921 as co-manager of La Mailleraye refinery and in 1928 became director and managing director of the Societe de la Mailleraye until it was merged with the Jersey Standard affiliate in 1935. In 1936 Young was made assistant manager of the Port Jerome refinery and in 1937 was advanced to general manager of the Port Jerome plant and of the La Mailleraye refinery. From 1948 until 1952 he was Esso's industrial manager in Paris and since then had been in charge of the company's refining, research, supply, and transportation activities. **August Schlageter,** with the Port Jerome refinery, now has assumed these duties

Elmer F. Schmidt and **Chester L. May,** vice presidents and directors of Lone Star Gas Co., have been elected executive senior vice presidents. Other changes include the election of **L. T. Potter,** assistant to the president, to executive vice president and to the board of directors; **Marshall Newcomb,** general counsel and director, to vice president. Elected vice presidents were: **Julian L. Foster,** superintendent of transmission;

L. T. POTTER

E. F. SCHMIDT

C. L. MAY

E. A. Brown, manager of exploration and gas supply; **M. L. Bird,** operating manager of the general division of distribution; **W. F. Wright,** general manager of Dallas division of distribution; and **Joe C. Darrow,** general manager of Fort Worth division of distribution.

George R. Gibson, independent geologist, has been elected president for 1954 of the West Texas Geology Society. Other officers are: **Nugent T. Brasher,** district geologist for Stanolind Oil & Gas Co., vice president; **Clem E. George,** independent geologist, treasurer; and **J. V. Hardwick,** district geologist for British American Oil Producing Co., secretary. All are of Midland, Tex.

James G. Stevens has resigned as executive vice president and treasurer of Douglas Oil Co. of California and will be succeeded as executive vice president by **George T. Goggin,** now general counsel and a director. Stevens has been with Douglas for 7 years, the last 5 as executive vice president and treasurer. He will continue as a director and a member of the executive committee. Goggin, a director since 1946 and general counsel for 5 years, recently spent 7 months in Peru consummating contracts and concessions for oil-producing property which Douglas is now developing.

PERSONALS

Frank F. Painter, geologist with Carter Oil Co., has been transferred from Billings, Mont., to Tulsa.

Wilson M. Williams, who joined the marketing-coordination department of Standard Oil Co. (N. J.) in 1947 as a specialist in L.P.G. and who formerly was with International Petroleum Co., Ltd., has been appointed the department's area contact coordinator for Brazil, Argentina, and Uruguay. Williams is scheduled to make an extended trip to the three countries to visit Jersey affiliates.

Henry B. Wilson, Jr., formerly general manager in Peru for International Production Co., Ltd., has been named to a new post as a vice president and director of Esso Standard Oil Co. of Brazil. Wilson was scheduled to take up his new duties early in January. Both companies are affiliates of Standard Oil Co. (N. J.).

John A. Newman has opened offices in Houston as a consultant in petroleum and natural-gas engineering. He was with Atlantic Refining Co. from 1944 to 1946 and was with Shell Oil Co. in Houston from 1946 until late in 1952 as division reservoir engineer and area proration and unitization engineer.

G. R. McMILLIN

George R. McMillin, formerly superintendent of the Sarnia, Ont., refinery of Imperial Oil, Ltd., has been named superintendent of the company's Imperoyal refinery at Halifax, N. S., which will be expanded and modernized into the largest refinery-construction project ever undertaken in Canada *(The Oil and Gas Journal, January 18, 1954, page 56).* McMillin succeeds Norman W. McCrea, who died last fall.

Efrain E. (Frank) Barberii has been appointed director of the petroleum engineering school of the National University of Zulia, Maracaibo, Venezuela. The school is being organized by the university with the full endorsement and cooperation of the national government. Barberii has been in charge of petroleum engineering for Mexican-American Independent Oil Co., Mexico, D.F. Formerly Barberii was professor of petroleum engineering at the University of Tulsa, and for 3 years was assistant engineering editor of Petroleo Interamericano, affiliate publication for Latin America of The Oil and Gas Journal.

Pipe-Line Builders Attend Annual Convention

Executives and operating men of pipe-line contracting firms present at the sixth annual convention of the Pipe Line Contractors Association at the Shamrock Hotel in Houston last week included: (left to right) H. L. Leake, Houston Contracting Co., Houston; W. E. Honey, Latex Construction Co. of Georgia, Atlanta; R. P. Gregory, Houston Contracting, Houston; L. C. Fuller, Browning-Ferris Machinery Co., Dallas; H. J. Muckley, Houston Contracting, Houston; and J. W. Sharman, Associated Pipe Line Contractors, Inc., Houston.

James F. McNamara has been elected chairman of the board and president of Alox Corp. of New York, producers of petrochemicals. This follows the recent purchase of control of Alox by Surpass Petroleum, Ltd., Toronto, of which McNamara is chairman of the board.

John L. Ferguson, geologist, has resigned as vice president of Deep Rock Oil Corp., Tulsa, to become a consultant, specializing in exploration problems. Ferguson joined Deep Rock over 3 years ago to set up an organization to provide the company with personnel and technical knowledge to carry on expanded exploratory activities.

Marshall C. Turner has been named assistant to the chief engineer of the production department of Phillips Petroleum Co. Turner, who will headquarter in Bartlesville, Okla., had been division superintendent in Long Beach, Calif., for Continental Consolidated Corp., subsidiary of Phillips.

Donald W. Frison has been appointed assistant manager of the petroleum chemicals division of the Mid-Continent district of E. I. du Pont de Nemours & Co., Inc., with headquarters in Tulsa. He joined Du Pont in 1947 as manager of the Tulsa laboratory and had been assistant sales-promotion manager of the petroleum chemicals division since 1952.

R. E. Pierson has been promoted by Stanolind Oil & Gas Co. from senior mechanical engineer at Tulsa to senior petroleum engineer at Fort Worth, Tex.

Victor H. Zoller has resigned as assistant manager of exploration for The Chicago Corp. at Fort Worth, Tex., to join White Eagle Oil Co., Tulsa, as a vice president. He has been placed in charge of the firm's new division exploration office in Midland, Tex. Zoller had been with The Chicago Corp. since 1947.

Gordon Crowe, formerly senior technical service representative for Spencer Chemical Co., Kansas City, has been promoted to the new post of assistant manager of the company's technical service section.

I. H. Hughes has resigned as assistant manager of International Petroleum Co. (Colombia) and has purchased an interest in Manning & Nance, Inc., workover and drilling contractors located in Houston.

George H. Truman, Jr., Bakersfield, Calif., has been promoted to superintendent of the operating department of Tide Water Associated Oil Co.'s San Joaquin Valley area district. He replaces **Thomas E. Weaver,** Oildale, Calif., who has been transferred to the company's Los Angeles area with headquarters in

PERSONALS

Los Nietos, Calif., replacing **Frank C. Foster,** who has retired. Truran joined the firm in 1946 and was made production foreman in 1949.

Newell F. Williams has been made manager for Union Oil Co. in Peru, with headquarters in Lima. **William A. Grenwalt** has been appointed chief geologist for Union's Peruvian operations, and **Stanley Martin** has been placed in charge of drilling for Union.

H. F. Dangberg has been advanced by Hancock Oil Co., Long Beach, Calif. to assistant production department manager. He joined the firm in 1945 as senior petroleum engineer and has worked in various positions of the production department, the latest being field manager at Bakersfield.

Dr. Eugene J. Houdry, of Houdry Process Corp. and pioneer in the development of catalytic cracking, has been selected to receive the John Scott Medal Award of the Board of City Trusts of Philadelphia. The award was established in 1816 by John Scott, a Scottish chemist.

William B. Rodan, formerly district geologist for Pan American Production Co. at Abilene, Tex., in charge of the firm's exploratory activities in West Texas, has been transferred to Houston in a new post of assistant superintendent of the exploration department. **Jack H. Hendrickson,** geologist in Pan Am's Abilene office since 1949, has been promoted to district geologist for West Texas and the Abilene area. **Ray E. Fairchild** has been transferred from Abilene to Houston where he will do research and work on special problems.

Robert A. Bishop has been promoted by Sohio Petroleum Co. from northwest division geologist in Billings, Mont., to manager of the firm's Canadian operations, replacing **Brame Womack,** who has been transferred from Regina, Sask., to Oklahoma City. **Walter Johnson** has been advanced from staff geologist at Lewistown, Mont., to replace Bishop in Billings. Prior to joining Sohio in 1949 Bishop was a consultant in Calgary, Alta. He also had been with Socony-Vacuum Oil Co., Inc., in South America and the United States for several years.

Adolph F. Spiehler has been appointed operations manager in the refining division of Pure Oil Co. and will have direct charge of operations in all the firm's refineries. He joined Pure Oil in 1928 as a development engineer and for the past 23 years has been in the company's headquarters in Chicago in the refinery-process section. For 2 years he has been assistant manager of the refinery technical department. His headquarters will remain in Chicago.

Joseph L. Seger, Interstate Oil Pipe Line Co., Shreveport, has been elected president and director of Yellowstone Pipe Line Co., which is building a 537,-mile products pipe line from Billings, Mont., to Spokane, Wash. Other new officers and additional members of the board of directors named at the recent reorganization meeting are: **W. L. Kygar,** Continental Pipe Line Co., Ponca City, Okla., vice president, general manager, and a director; **John D. Morrow,** Continental Pipe Line, Ponca City, secretary; **R. T. Bosworth,** Continental Oil Co., Houston, treasurer; **P. H. Hunter,** Interstate, assistant secretary treasurer; and **Thomas Brownfield,** Carter Oil Co., Tulsa; **J. W. Liddell,** Continental Oil, Denver; **T. A. van Griethuysen,** Continental Oil, Houston; **E. L. Hiatt,** Union Oil Co. of California, Los Angeles; and **W. Turner Clack,** Spokane, Wash., all directors.

M. S. Kendrick, a member of Creole Petroleum Corp.'s management committee, has retired and returned to the United States.

W. K. Whiteford, president of Gulf Oil Corp., and **David Proctor, W. L. Naylor,** and **R. O. Rhoades,** Gulf vice presidents, arrived in Venezuela in mid-January for an inspection tour of various operations of Mene Grande Oil Co.

Howard S. Spering and **Arnold G. Matthies,** assistant directors of the refining and natural-gasoline division of the Petroleum Administration for Defense, have resigned. Spering, who was assistant to the president of Texaco Development Corp. before joining PAD in April 1953, will practice law in Washington, and Matthies, who joined in February 1953, will return to Esso Standard Oil Co. at Baton Rouge. **Roy P. Wilson,** formerly chief of the refining technology branch, who has been on leave from Sinclair Refining Co. to serve PAD since January 1951, and **Albert L. Anderson,** chief of the aviation fuels and petroleum products-supply branches, who has been on leave from Sun Oil Co. since last June, will succeed Spering and Matthies.

DEATHS

C. W. Dittman, 68, died recently at Vincennes, Ind. He had been in the oil industry about 38 years, 5 of which were in Venezuela with Shell Oil Co.

Charles V. Ostrander, 72, died recently at Fanwood, N. J., after a long illness. He was an assistant to the vice president of Socony-Vacuum Oil Co., Inc., when he retired in 1944.

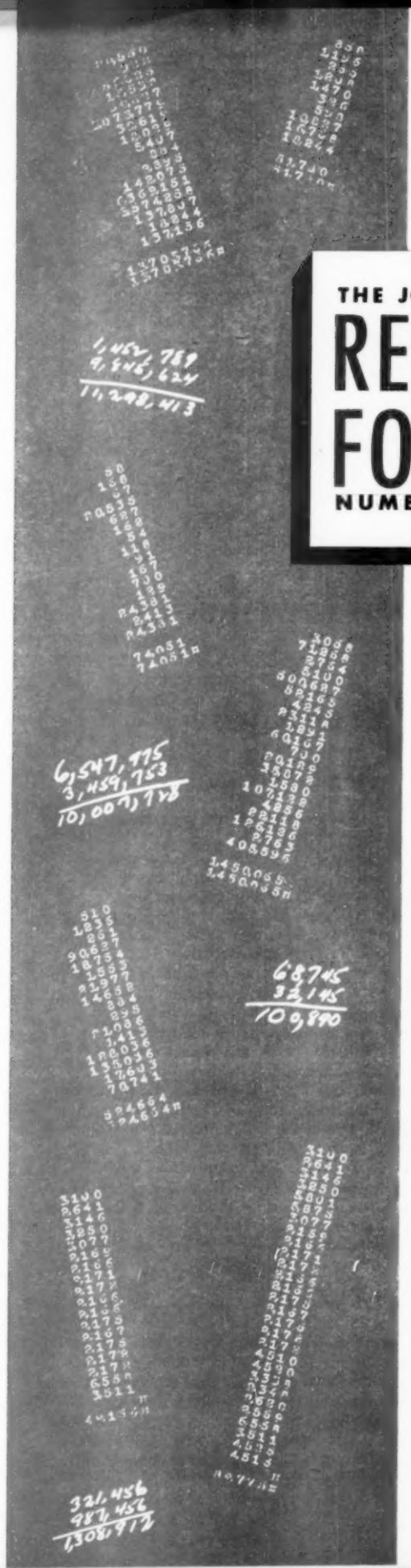
Robert M. Bass, Sr., 54, president of Bass Drilling Co., Kilgore, Tex., died recently in Dallas following a heart attack. Prior to organizing his drilling firm in 1940, he was with Sinclair Prairie Oil & Gas Co. Bass was chairman for 1954 of the Ark-La-Tex chapter of the American Association of Oilwell Drilling Contractors.

Donald H. Topper, 53, assistant district superintendent for Amerada Petroleum Corp. at Monument, N. M., died recently following a long illness. He had been with Amerada for 33 years and had been assistant district superintendent at Monument since 1940.

Dr. Homer James Smith, 52, manager of geological and exploitation activities for Socony-Vacuum Oil Co., Inc., died January 14 following a heart attack in Bogota, Colombia. He was a professor of geology at the University of Tulsa from 1936 until he joined Socony in 1943.

John Joseph McLean, 52, independent operator, died recently in Wichita, Kans., following a heart attack.

Addison F. Holliday, 79, died January 15 in Pittsburgh. He was former vice president and director of Plymouth Oil Co. and Big Lake Oil Co. and former president of Hiawatha Oil & Gas Co. and Penn-Ohio Gas Co. Holliday also was a former director of Republic Oil Refining Co., Republic Pipe Line Co. and Duval Pipe Line Co.

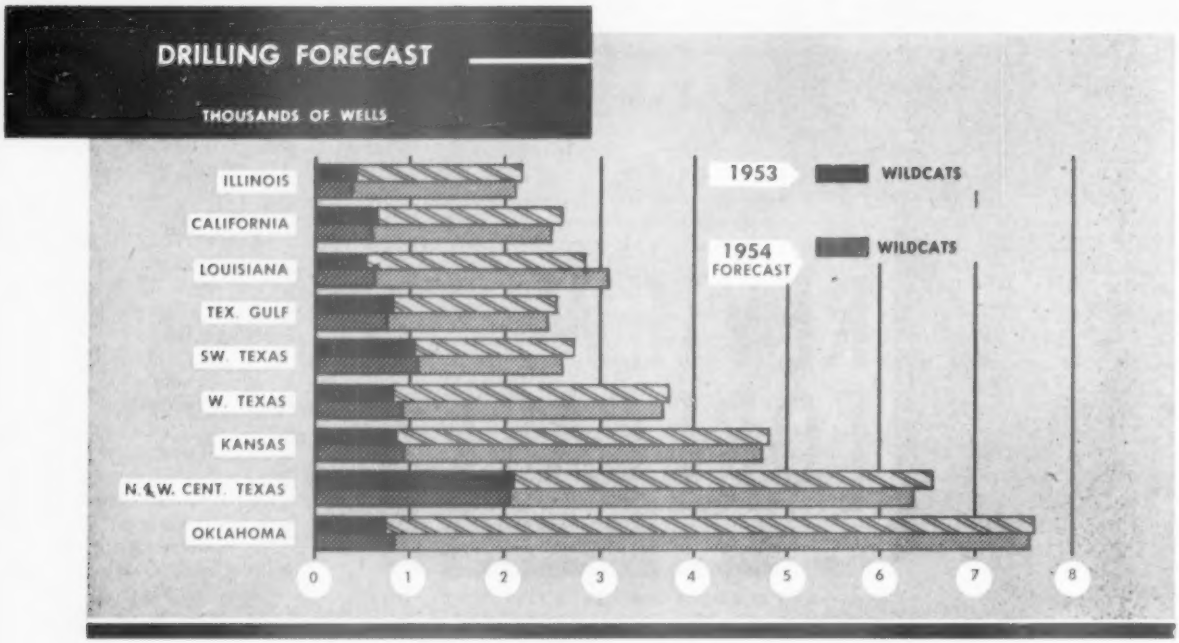


THE JOURNAL'S

REVIEW FORECAST NUMBER

- ✓ **DRILLING PROGRAMS** for 1954 call for a total of 48,410 wells including 11,218 wildcats and 37,192 field wells.
- ✓ **TOTAL COMPLETIONS** reached a new high in 1953 with 49,279 wells, an increase of 3,458 wells or 7.5 per cent.
- ✓ **WILDCAT COMPLETIONS** gained 4.8 per cent in 1953 to set another all-time record with 11,062 wells.
- ✓ **CRUDE PRODUCTION** gained 3.2 per cent to 6,460,000 bbl. daily in 1953 and will reach 6,557,000 bbl. daily for 1954.
- ✓ **PROVED RESERVES** of total liquid hydrocarbons increased 901,000,000 bbl. in 1953 to a total of 34,636,000,000 bbl.
- ✓ **TOTAL DEMAND** passed the 8,000,000-bbl.-daily mark in 1953 and domestic demand will pass that level in 1954.
- ✓ **REFINERY RUNS** averaged 7,002,000 bbl. daily in 1953, up 5 per cent. Runs may average 7,134,000 bbl. daily in 1954.
- ✓ **PRODUCTION** at natural-gasoline and cycling plants averaged 662,400 bbl. daily in 1953 for a gain of 9.5 per cent.
- ✓ **WORLD PRODUCTION** averaged 13,021,800 bbl. daily in 1953. Total reserves are estimated at 139,312,500,000 bbl.
- ✓ **NATURAL-GAS PRODUCTION** increased 5.2 per cent to 8,423,247 M.M.c.f. Reserves are estimated at 205,353,000 M.M.c.f.

ENGINEERING in 1953
and
NEWS HEADLINES in 1953



SLIGHT DROP FROM '53

Operators Program 48,410 Wells for '54

by John C. Casper

REPORTS from operators in every important oil area in the country indicate that wildcat drilling will be up about 1.4 per cent in 1954, but that this gain will be more than offset by a decrease of 2.7 per cent in development drilling. The resulting total is 48,410 wells for a decrease of 869 wells or 1.8 per cent from 1953.

Part of the reason for an increase in exploratory drilling at a time when development drilling is decreasing can be found in the record for 1953. Total completions in 1953 represented a gain of 7.5 per cent over 1952. The breakdown by types of drilling shows an increase of only 4.8 per cent in wildcat drilling compared with the increase of 8.4 per cent in development drilling.

The table on page 137, showing reserves at the end of the year and additions during the year, indicates that the additions credited to 1953 discoveries were only about 65 per cent of oil discovered in 1952. Since the number of wildcats that found oil in 1953 was up 5.8 per cent from 1952 and the oil credited to these discoveries was down about 65 per cent, the general conclusion is that there was a lack of outstanding discoveries for the year.

Much of the increase in development drilling in 1953 came from scattered drilling in older areas. Oklahoma and Kansas accounted for about 58 per cent of the increase in development completions for the year. As these inside locations become scarce, operators must include more wildcat wells to develop drillable acreage. Reports on drilling programs indicate that this increase will come in 1954.

The forecast of development drilling is based on the plans of operators at the first of the year. These plans are subject to change during the year as conditions change in the different areas.

A few good discoveries at moderate depths in the early months of the year would tend to boost both exploratory and development drilling for the remaining months of the year. In some cases, such important discoveries would result in shifts among areas with rigs and appropriations transferred from less likely districts to follow the hot play in the area of an important new discovery. In other cases, new discoveries will mean increases in over-all drilling.

Proof that company drilling plans at the first of the year can be changed during the year is found in a comparison of the number of wells that companies reported as planned at the first of 1953 and the number reported actually drilled by the end of the year.

Reports of 50 larger operators, including but not confined to those normally listed as major companies, were compared to determine the extent of deviations in drilling operations during the year from the programs reported at the first of the year. The shifts in drilling programs among states were too numerous for accurate comparisons. Some companies drilled more total wells during the year than were reported on the programs at the first of the year, and others drilled fewer.

The number of wells completed by these 50 companies in 1953, shown by reports at the end of the year, was 8.4 per cent greater than the total that these companies reported as planned at the first of the year. A general comparison of reports from smaller companies indicated that some added to drilling programs during the year while others cut back on drilling, but with an over-all net increase for the year.

If the Journal's forecast for last year had been made

Drilling Forecast for 1954 by Areas

	1954 forecast				Change from 1953 actual			
	Wildcat wells	Field wells	Total wells	Total footage	Wildcat wells	Field wells	Total wells	Total footage
Alabama	36	13	49	260,000	—39	— 15	— 54	— 281,000
Arkansas	102	425	527	1,945,000	—38	— 8	— 46	— 166,000
California	624	1,863	2,487	10,940,000	—42	— 49	— 91	— 415,000
Colorado	389	348	737	3,850,000	25	— 22	3	20,000
Florida	28		28	197,000	— 2		— 2	2,000
Illinois	390	1,757	2,147	5,390,000	—35	17	— 18	— 35,000
Indiana	346	855	1,201	1,975,000	—27	— 52	— 79	— 127,000
Kansas	963	3,725	4,688	15,880,000	76	—171	— 95	— 337,000
Kentucky	220	934	1,154	2,335,000	7	— 17	— 10	— 20,000
Louisiana	586	2,458	3,044	20,890,000	73	143	216	1,765,000
North	193	1,151	1,344	4,685,000	16	33	49	155,000
South	393	1,307	1,700	16,205,000	57	110	167	1,610,000
Michigan	287	340	627	1,610,000	8	— 4	4	7,000
Mississippi	212	198	410	2,770,000	5	8	13	20,000
Montana	141	292	433	1,900,000	15	— 33	— 18	— 33,000
Nebraska	153	140	293	1,515,000	— 8	— 19	— 27	— 141,000
New Mexico	188	1,165	1,353	7,680,000	20	— 85	— 65	— 337,000
New York	10	591	601	905,000	10	—105	— 95	— 102,000
North Dakota	107	169	276	2,100,000	16	— 10	6	138,000
Ohio	23	1,080	1,103	2,320,000	1	22	23	46,000
Oklahoma	795	6,690	7,485	25,780,000	53	—161	—108	— 342,000
Pennsylvania	29	1,164	1,193	2,425,000	9	—323	—314	— 555,000
South Dakota	32		32	160,000	12		12	57,000
Texas	5,238	11,621	16,859	77,850,000	— 7	—137	—144	— 795,000
Dists. 1 and 4	1,053	1,561	2,614	12,810,000	18	—109	— 91	— 435,000
Dists. 2 and 3	837	1,624	2,461	15,890,000	—51	— 8	— 59	— 471,000
Dists. 5 and 6	324	553	877	4,570,000	24	45	69	361,000
Dists. 7-B and 9	2,080	4,290	6,370	21,630,000	—40	— 55	— 95	— 327,000
Dists. 7-C and 8	904	2,800	3,704	20,170,000	28	— 59	— 31	— 148,000
Dist. 10	40	793	833	2,780,000	14	49	63	225,000
Utah	44	30	74	420,000	2	2	4	24,000
West Virginia	18	610	628	1,700,000	— 5	15	10	25,000
Wyoming	207	706	913	4,330,000	18	— 22	— 4	— 7,000
Miscellaneous	50	18	68	152,000	9	1	10	29,000
Total United States	11,218	37,192	48,410	197,279,000	156	—1,025	—869	—1,560,000
Western Canada	850	1,590	2,440	10,180,000	136	89	225	943,000

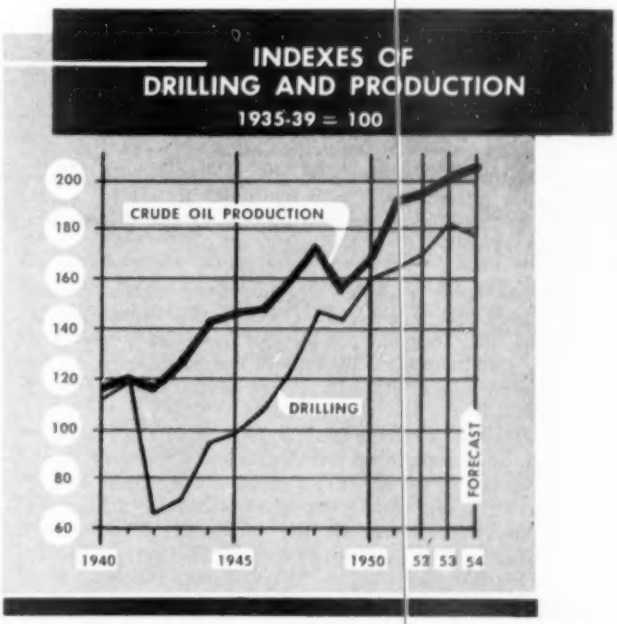
from the same large sample of operators and if these operators had shown programs for 1953 up 8.4 per cent from the totals actually reported, the forecast for the year would have been raised to about 50,000 wells.

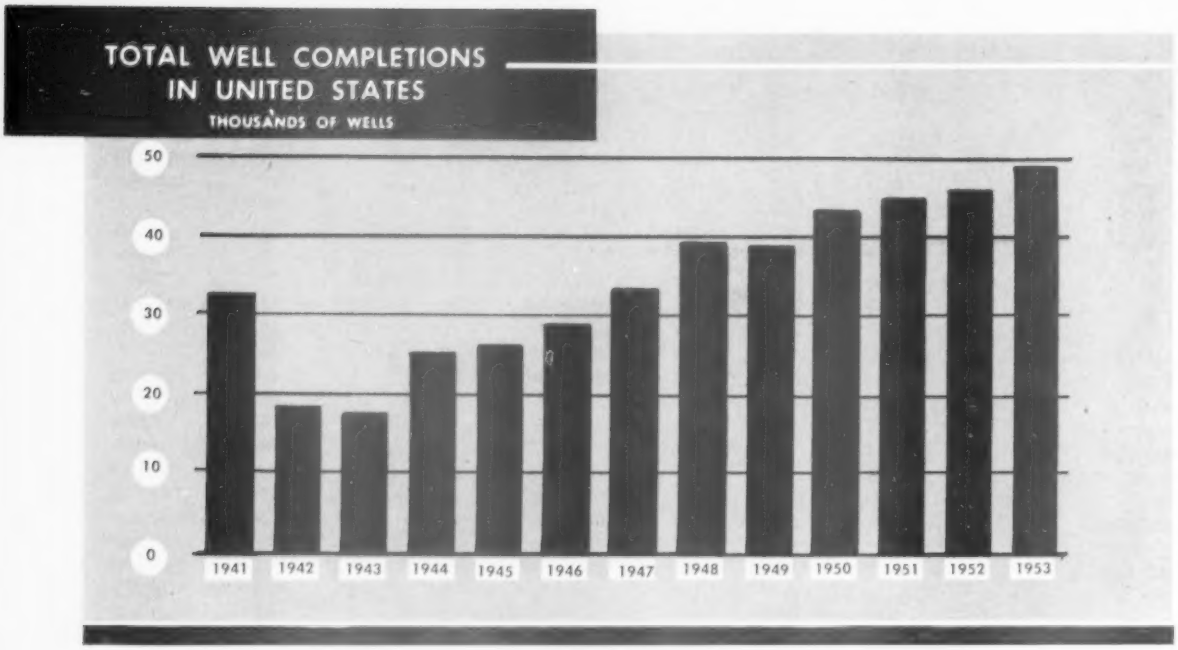
In like manner, the forecast for 1954 is based on company plans at the first of the year, and any change in company plans during the coming months will be reflected in the final drilling totals for the year.

The largest increase in drilling for 1954 is forecast for Louisiana, and the largest number of total wells will be in Texas. Drilling in Texas this year will represent about 34.8 per cent of total drilling compared with 34.5 per cent in 1953.

Operators in Louisiana are expected to drill a total of 3,044 wells in 1954 for a net gain of 216 wells over 1953. Most of the gain will be in South Louisiana. The ratio of completions by districts in Louisiana has shifted several times in the last 15 years. South Louisiana moved ahead again in 1953 and is expected to extend the lead in 1954 with 55.9 per cent of the wells and 77.6 per cent of total footage for the state.

Western Canada is included in the forecast for the first time. Drilling in the four western provinces and Northwest Territories is expected to be up 225 wells in 1954 to 2,440.





50,000 MARK APPROACHED

Completions Up 7.5 Per Cent Over 1952

by Carl Hoot

DRILLERS in 1953 came close to the 50,000-well mark of various estimates made as the year opened, based on anticipated product demands. Completions for the year totaled 49,279. The gain in total wells of 3,458 over 1952 was an increase of 7.5 per cent, nearly double, percentage-wise, the relative comparative increase last year.

Total oil wells were 25,762, up 2,296 over the previous year, which was a gain of 9.8 per cent. Continued expansion of gas markets and pipe-line carriers accounted for continued drilling which netted 3,806 gas wells during the year. The gain of 551 wells over the previous year represented an increase of 16.9 per cent. Dry holes totaled 18,449, compared with 17,618 in the previous year. This figure did not include 1,262 holes classified as service wells which were drilled during 1953.

What figures exclude . . . The above figures do not include recompletions, nor those wells drilled deeper after their original completion. It is also doubtful if the record includes the wells in the hundreds of waterflood projects in several of the older producing areas of Oklahoma and North Texas.

Consensus is the net increase in drilling throughout this country represents substantial industry gains, inasmuch as no one experienced a false boom during the year, comparable to development of the Scurry County reef fields or the Spraberry Trend fields. Texas drilling figures were approximately the same as for the previous year, having passed the 1952 total only during the last 2 weeks in December.

A review of footage records and total footage drilled shows a continued upturn in deep operations. Total footage in 1953 was close to 200,000,000 ft., representing a gain of 10 per cent over the previous year.

The increase in completions in the United States in 1953 was due in part to the surge of drilling in Oklahoma. Total completions in the Sooner State were 7,593, up more than 31 per cent over the previous year.

A wave of shallow and intermediate-depth drilling swept through the central and east-central counties, as well as in the south-central and northward into the Osage country. Lincoln County in Central Oklahoma led that part of the state both in wildcat and total completions. Stephens and Carter counties remained in first place as the biggest well-completion area. Cimarron County in the Oklahoma Panhandle came out in front in that area, with the rapid development of the new Sturgis Keyes sand gas area. Completions in Oklahoma ran well over 150 per week nearly every week in the year, and at year's end were still running high, promising that 1954 will set another new record. More than 26,000,000 ft. of hole was dug to make this remarkable record.

Kansas sets record . . . Kansas operators set another record high in that state, finaling 4,783 wells. More than 16,200,000 ft. of hole was dug to set the state's new record. Central Kansas uplift activity again dominated the scene, but there was a tendency for drilling to move to the southwest and northwest flanks of the uplift in 1953, a result of good discoveries in Pawnee

Total United States Completions By States

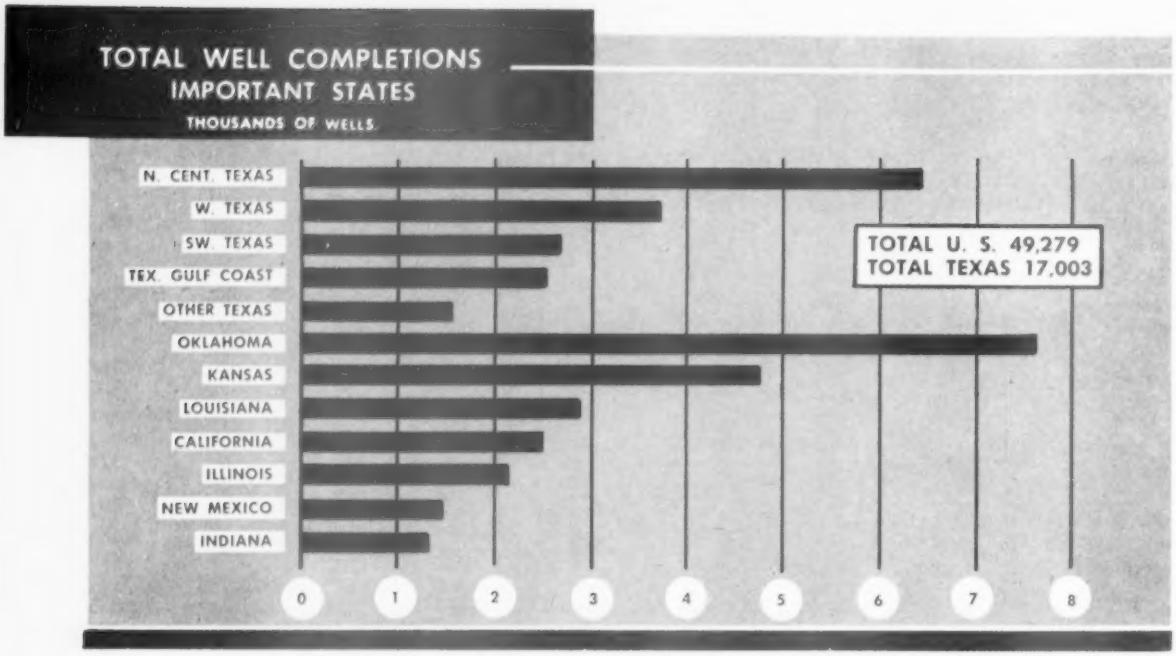
	Total comp.	Oil	Gas	Service	Dry	Average footage	Comp. 1952
Alabama	103	17	0	0	86	5,257	72
Arkansas	573	273	1	1	298	3,684	427
California	2,578	1,869	48	12	649	4,443	2,433
Colorado	734	258	63	0	413	5,218	486
Florida	30	0	0	0	30	6,517	10
Illinois	2,165	1,070	4	0	1,091	2,506	2,149
Indiana	1,280	452	22	3	803	1,642	1,277
Kansas	4,783	2,209	380	68	2,126	3,391	4,571
Kentucky	1,164	398	194	1	571	2,033	1,300
Louisiana	2,828	1,599	222	14	993	6,763	2,385
North	1,295	722	119	13	441	2,498	1,304
South	1,533	877	103	1	552	9,520	1,081
Michigan	623	244	19	3	357	2,573	707
Mississippi	397	134	12	0	251	6,926	348
Montana	451	221	22	0	208	4,287	345
Nebraska	320	125	12	0	183	5,175	291
New Mexico	1,418	575	600	0	243	5,654	1,053
New York	696	355	0	340	1	1,447	767
North Dakota	270	172	1	0	97	7,267	122
Ohio	1,080	469	176	87	348	2,105	1,052
Oklahoma	7,593	4,596	339	133	2,525	3,440	5,781
Pennsylvania	1,507	629	254	545	79	1,977	1,884
South Dakota	20	0	0	0	20	5,129	14
Texas	17,003	9,380	978	55	6,593	4,626	16,845
North Central (9)	3,675	2,060	28	33	1,554	3,328	3,205
West Central (7-B)	2,790	1,500	23	1	1,266	3,486	2,335
West (7-C & 8)	3,735	2,664	30	15	1,026	5,440	4,945
Panhandle (10)	770	418	268	0	93	3,355	633
East (5 & 6)	808	300	99	1	402	5,212	785
Gulf Coast (2)	877	323	140	0	414	6,073	823
Gulf Coast (3)	1,643	810	151	2	680	6,716	1,759
Southwest (1)	917	428	15	0	474	3,150	758
Southwest (4)	1,788	877	224	3	684	5,792	1,602
Utah	70	17	9	0	44	5,653	79
West Virginia	618	70	420	0	128	2,710	606
Wyoming	917	622	25	0	270	4,730	700
Miscellaneous	58	8	5	0	42	2,113	117
Total 1953	49,279	25,762	3,806	1,262	18,449	4,035	
Total 1952	45,821	23,466	3,255	1,482	17,618	4,085	45,821
Total 1951	44,516	23,453	3,030	1,380	16,653	3,871	
Total 1950	43,279	24,430	2,843	1,249	14,757	3,680	
Total 1949	39,038	22,042	2,887	1,382	12,727	3,538	
Total 1948	39,778	22,585	2,897	2,270	12,076	3,454	

County on the southwest and in Norton County on the northwest.

The Hugoton embayment area of Kansas set new records with Seward County to the east of Hugoton gas field, and Morton County in the far southwest leading the way. Important gas extensions and development programs in southwestern Kansas resulted from the opening of new pre-Permian reservoirs in Seward and Morton counties. Kansas' new gas field in Morton County, was extended into Colorado, making it the year's most important development spot. New discoveries in the Forest City and Salina basins brought those practically productionless basins into the highlights during 1953. Sedgwick basin and southern Kansas counties experienced a rather intensive development and exploratory program.

Rocky Mountains . . . New records were set in the Rocky Mountain states. Nearly every month of the year saw a new high in completions and discoveries. Wyoming and Colorado led the entire region in the number of completed wells. Wyoming operators finaled more than 900 wells, while 734 wells were completed in Colorado, both wildcat and field wells.

Weston County, on the eastern flank of Powder River basin, was the most active county in Wyoming. Last winter more new locations were announced in Wyoming fields than in any previous midwinter period in the history of the industry in the Rocky Mountains. The increase in development drilling started as a result of the new Platte Pipe Line's outlet facilities. Little Buffalo basin and Sage Creek were especially active. Denver-Julesburg basin of Colorado and west-



ern Nebraska was again the most active Rocky Mountain basin, particularly in the Little Beaver area of Washington and Adams counties.

Development drilling kept pace with wildcat activity and resulted in 83 per cent of the wells being productive. Although more wildcats were drilled in Colorado during the year than in any other Rocky Mountain state, the percentage of successful wildcats was below that of Wyoming. Wyoming also led the region in development drilling.

Although wildcat drilling was considerably increased, development drilling maintained an even higher ratio over previous years. This was primarily due to increased crude and refined products outlets from the region. Production through the Rockies increased more than 25 per cent as Platte Pipe Line, Service Pipe Line, and others from the region to refining centers carried capacity loads.

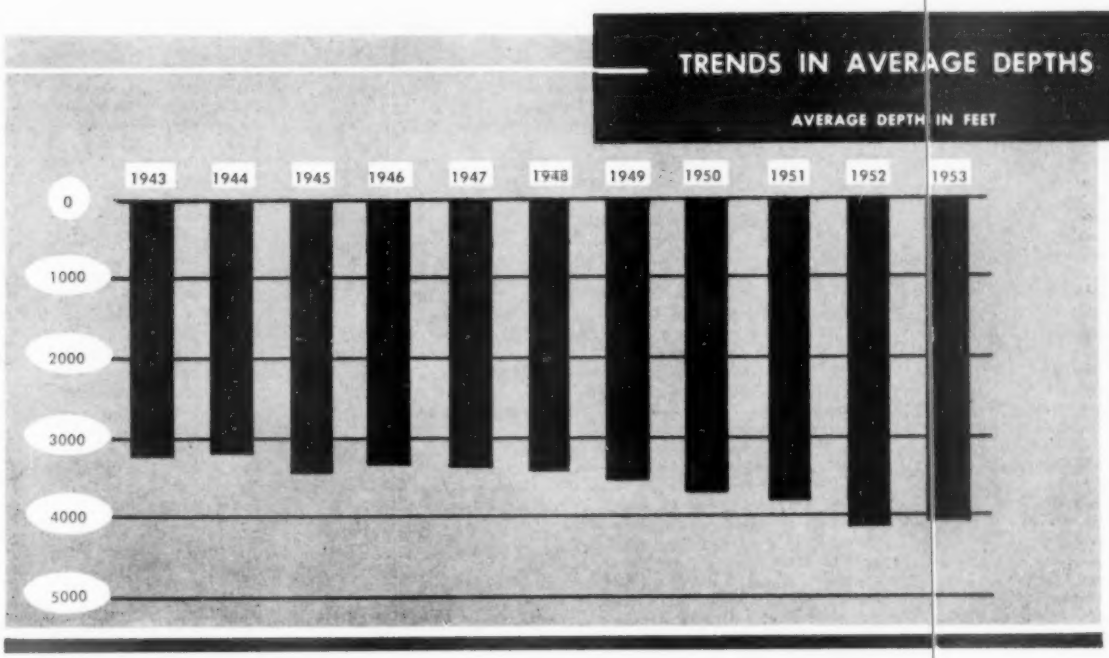
Leasing activity dropped slightly from high levels of previous years, with more selective buying, particularly through the Williston basin. This was partially due to large lease spreads held by major operators, calling for a processing period of lease blocks rather than additional acquisition. Leasing activity extended from the Canadian border south through all of the states into Arizona and New Mexico.

As processing of large lease holdings spread, both geological and geophysical operations in the Rocky Mountains reached new highs. Total geophysical exploration was considerably increased, primarily through the northern portion of the region and in the Williston basin. As many as 125 crews were active in this area during a part of the year. Successful wildcats drilled as a result of part of this geophysical work indicates a continuance of the heavy program.

Texas total wells gained 158 for the year, with a total of 17,003. Total wells exceeded last year's figures only during the last 2 weeks of December. Most of the state's areas showed drilling gains, but West Texas, hit by the sudden stoppage of work in Spraberry Trend fields, registered a loss of 1,210 wells in 1953. An optimistic note in West Texas figures is the average footage comparison, which in 1953 was 5,440 ft., as against 3,407 ft. in 1952. This was brought about by pre-Permian drilling and development work in the Central basin platform fields.

DEVELOPMENT COMPLETIONS BY STATES

	Comp.	Oil	Gas	Dry
Alabama	28	16	0	12
Arkansas	433	261	1	171
California	1,912	1,786	29	97
Colorado	370	228	51	91
Florida	0	0	0	0
Illinois	1,740	1,054	4	682
Indiana	907	430	20	457
Kansas	3,896	2,113	343	1,440
Kentucky	951	383	190	378
Louisiana	2,315	1,475	201	639
North	1,118	709	115	294
South	1,197	766	86	345
Michigan	344	223	13	108
Mississippi	190	111	7	72
Montana	325	209	22	94
Nebraska	159	104	7	48
New Mexico	1,250	547	585	118
New York	696	355	0	341
North Dakota	179	161	0	18
Ohio	1,058	467	170	421
Oklahoma	6,851	4,475	302	2,074
Pennsylvania	1,487	629	250	608
Texas	11,758	8,476	809	2,473
North Central (9)	2,617	1,830	20	767
West Central (7-B)	1,728	1,287	12	429
West (7-C & 8)	2,859	2,484	17	358
Panhandle (10)	744	416	268	60
East (5 & 6)	508	271	94	143
Gulf Coast (2)	568	282	114	112
Gulf Coast (3)	1,124	721	104	299
Southwest (1)	485	399	5	81
Southwest (4)	1,185	786	175	224
Utah	28	14	5	9
West Virginia	595	70	407	118
Wyoming	728	594	22	112
Miscellaneous	17	6	1	10
Total 1953	38,217	24,187	3,439	10,591
Total 1952	35,269	21,974	2,987	10,308



CALIFORNIA HAS DEEPEST WELL

Depth Records Broken in Six Areas

by John C. McCaslin

DRILLING-DEPTH records in six areas were broken during 1953, and five areas reported new producing-depth records. California displaced Wyoming as boasting the deepest well in the world, and also retained the deepest producing well in the world. However, South Louisiana took the lead during the year, only to drop back into second place.

The deepest well in the world is now Ohio Oil Co. 72-4 K.C.L. in Paloma field, Kern County, California. Ohio's deeper-pool test is at 21,482 ft. in the Miocene. It passed the record set by Superior Oil Co. 1 Unit in Sublette County, Wyoming, which was completed dry in 1949 in the Dakota at 20,521 ft. When the well was spudded on October 23, 1951, its objective was to test lower Miocene, Oligocene, and Eocene oil possibilities below Paloma field's regular 11,000-ft. upper Miocene pay.

The Point of Rocks sand in the Eocene was the original objective, but due to the thicker formations than were anticipated, it is considered unlikely that the objective will be reached. Nearly all drilling below the regular Paloma pay has been in sands and hard shales. The operator is presently fishing. If the well is a failure in the deep zones, it is considered doubtful that it will be completed in the field's present pay formation because it would disrupt the 40-acre spacing program.

In December, Richfield Oil Corp. won back the world's deepest producing well for California at 67-29 Coles Levee A in North Coles Levee field, Kern County. The well was completed for 119 bbl. of oil per day net from a producing zone between 17,500 and 17,892 ft. Closest Eocene production to the new well is Wheeler Ridge, about 25 miles south, and McKittrick, some distance northward.

At the beginning of 1953 California held the world's record at Standard of California 5 Mushrush in Kern County. The record holder produced from the Eocene at 15,530 ft. However, during the year Shell Oil Co. broke that record twice in Weeks Island field in Iberia Parish, Coastal Louisiana. The 2 Gonsoulin Minvielle found production at 17,260-17,306 ft. That well was completed for 141 bbl. of oil and 4,293 M.c.f. of gas per day through a 11/64-in. choke. Earlier the world's record was broken at Shell's 1 Weeks Island unit, also in

DEPTH CLASSIFICATIONS BY MONTHS

	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	10,000-12,500 ft.	12,500-15,000 ft.	Over 15,000 ft.
January	1,131	1,693	690	298	113	25	0
February	1,047	1,411	610	291	114	31	1
March	1,043	1,441	637	270	100	29	3
April	1,158	1,589	661	276	119	43	7
May	1,321	2,012	782	296	108	33	1
June	1,166	1,530	684	267	103	28	1
July	1,476	1,931	781	325	140	36	2
August	1,334	1,625	786	319	125	41	2
September	1,274	1,668	772	322	135	41	3
October	1,542	1,895	816	316	133	33	5
November	1,413	1,530	734	248	87	32	4
December	1,316	1,720	733	280	102	36	3
Total	15,221	20,045	8,686	3,508	1,379	408	32

United States Producing Depth Records

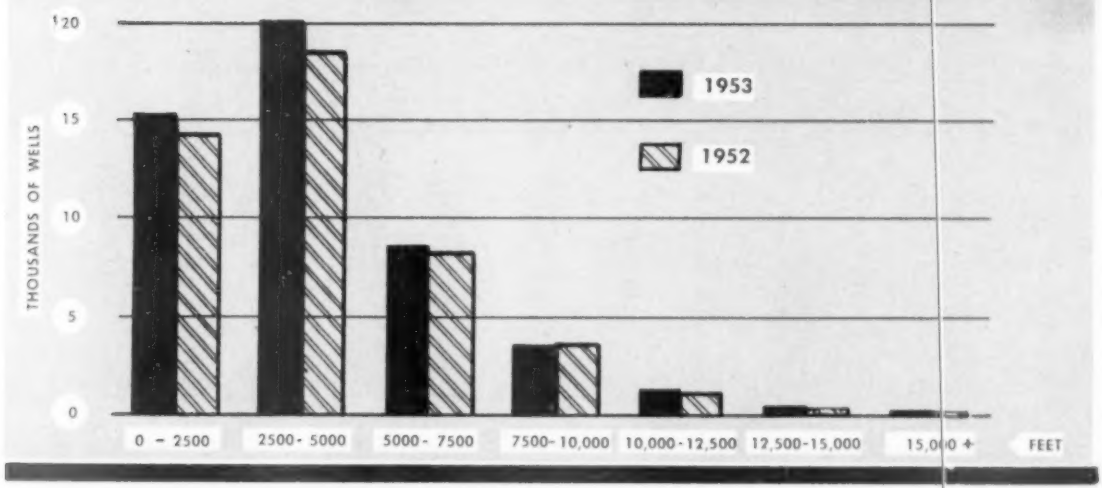
State or area—	Well and location; county	Result	Year comp.	Producing formation	Prod. depth
Alabama	Humble 5 Moye, Pollard field; Escambia	Oil	1952	Tuscaloosa	6,117
Arkansas	Atlantic 1 McKamie-Patton C-216; Lafayette	Oil	1952	Smackover	9,453
California	Richfield 67-29 Coles Levee A, North Coles Levee; Kern	Cond.	1953	Eocene	17,892
Colorado	Delhi-El Paso 5 Barker, 2-32n-14w; La Plata	Gas	1950	Paradox	9,841
Florida	Humble 1 Gulf Coast, Sunniland field; Collier	Oil	1943	Glen Rose	†11,626
Illinois	Kingwood 24-A Shanafelt, 20-2n-2e; Marion	Oil	1943	Trenton	4,657
Indiana	Lewis 1 Hill, 35-3s-14w; Posey	Oil	1939	McClosky	3,144
Kansas	Stanolind 1 Wall, 35-32s-23w; Clark	Oil	1951	Viola	6,576
Kentucky	United Carbon 1 Howe; Pike	Gas	1932	Devonian	5,170
Louisiana, North	Midstates Oil 1 Lewis-Hearn-Williams, Haynesville deep field; Claiborne	Oil	1949	Smackover "B"	10,864
South	Shell 2 Gonsoulin Minvielle-State Unit, Weeks Island; Iberia	Oil	1953	Miocene	17,306
Maryland	Cumberland-Allegheny S-424 Beachy, Ryans Glade 8 Dist.; Garrett	Gas	1949	Oriskany	4,456
Michigan	Michigan Gulf 1 Bateson, Kawkawlin field; Bay	*Oil	1946	Salina	7,850
Mississippi	Union Producing et al. 1 Logan, Tinsley field; Yazoo	‡Cond.	1951	Smackover	14,427
Missouri	Cities Service 1 Cook, Tarkio field, Atchison	Oil	1944	Bartlesville	1,444
Montana	Sun-Phillips 1 Dynneson, 32-24n-58e; Richland	Oil	1953	Ordovician	12,605
Nebraska	Gulf 1 Sisson, 18-21n-58w; Kimball	Oil	1951	Dakota	7,431
New Mexico, Northwest	Southern Union 9 Barker Creek, 21-32n-14w; San Juan	Gas	1945	Pennsylvanian	9,468
New Mexico, Southeast	Buffalo 12-B Baish, 22-17s-32e; Lea	Oil	1952	Devonian	13,573
New York	Kane 1 Lewis, West Union Twp.; Steuben	Gas	1942	Oriskany	5,228
North Dakota	Stanolind 1 Star-Tribal, 21-152n-94w; McKenzie	Oil	1952	Three Forks	10,556
Ohio	East Ohio 1 Phillips, Sec. 23, Wash. Twp.; Harrison	Gas	1941	Silurian	†5,899
Oklahoma	Denver 1 School Land, 16-10n-9w, Cogar field; Caddo	Gas	1948	Hunton	14,510
Pennsylvania	American Locomotive 5 Steiner, Unity Twp.; Westmoreland	Gas	1946	Oriskany	8,014
South Dakota	Shell 1 State "A," 9-21n-4e; Harding	§Oil	1953	Red River	8,600
Tennessee	York 2 Print Huff; Pickett	Oil	1947	Knox	1,702
Texas, East	Humble 1 Curtis, Larrison field, Cherokee	Oil	1942	Pettit	10,312
Texas Gulf Coast	Phillips 1-A Houston "R," Chocolate Bayou field; Brazoria	Gas	1952	Frio	12,847
Texas, North	Frank Weiner 1 Hazlip, Mineral Creek; Grayson	Cond.	1952	Mulder	10,160
Texas, West	Phillips 1-E Puckett, Glenna pool; Pecos	Gas	1953	Ellenberger	15,000
Texas Panhandle	Sinclair 10-J Lips, 2-1-BBB&C; Roberts	Gas	1952	Atoka	9,066
Texas, Southwest	Western Natural Gas 14 St. Charles Ranch, Blackjack field, Aransas	Gas	1951	Frio	11,490
Utah	Carter 1 Peterson, 13-1s-1w (USM); Uintah	Oil	1952	Wasatch	10,244
Washington	Hawksworth et al. 4 State, 15-18n-12w; Grays Harbor	‡Cond.	1951	Miocene	3,714
West Virginia	Ohio 1 Kuykendall et al., Dry Fork dist.; Tucker	Gas	1946	Oriskany	†8,410
Wyoming	Pure 1 Unit, 11-33n-84w; Natrona	Oil	1948	Frontier	14,307

*Now abandoned. ‡Not producing. §Not completed.

United States Drilling Depth Records

State or area—	Well and location; county	Result	Year comp.	Deepest formation	Total footage
California	Ohio 72-4 K.C.L.-A, Paloma field; Kern	Fsg.		Miocene	21,482
Wyoming	Superior 1 Unit, 27-27n-103w; Sublette	Dry	1949	Dakota	20,521
Mississippi	Vassen 1 Fee, 9-2s-11w; Stone	S.D.			20,450
Louisiana, South	Magnolia 1-D Ragley Lumber Co., 29-5s-7w; Allen	Dry	1952		18,660
Texas, Southwest	Superior 27 Minnie S. Welder, Portilla field; San Patricio	Oil	1951		17,966
Oklahoma	Superior 51-11 Weller, 11-8n-12w; Caddo	Dry	1947	Pennsylvanian	17,823
New Mexico, Southeast	Richardson & Bass 1 Harrison-Federal, 12-25s-30e; Eddy	Tstg.		Granite	16,705
Texas, West	Gulf Oil Corp. 1 Northrup, 33-50-T8-T&P; Reeves	Dry	1953	Permian	16,696
Texas Gulf Coast	Phillips 3 Schoeps, Millican salt dome; Brazos	Dry	1945	Cretaceous	16,655
Texas, East	Humble 1 McWatters; Freestone	Oil	1949	Smackover	16,347
Alabama	Humble 1 Williams, 10-3n-2e; Clark	Oil	1952	Jurassic	15,729
Florida	Gulf 1 State; Monroe	Dry	1947		15,155
Colorado	Mountain Fuel 1 Hiawatha, 14-12n-100w; Moffat	Gas	1952	U. Cretaceous	15,041
Louisiana, North	Cotton Valley Oper. Com.-Oliphant 2 Banks, Cotton Valley field; Webster	Dry	1947	Salt	14,967
North Dakota	Amerada 2 Kuam, 19-156n-95w; Williams	Oil		Winnipeg	14,600
Texas, North	Humble 1 Williams, Q. Yglesias Sur., A-1393; Grayson	Dry	1953		14,363
Texas Panhandle	Guff 1-E Porter "A," 413-43-H&TC; Lipscomb	Dry	1949	Ellenburger	14,278
Utah	Equity & Pacific Western 1 Unit, 33-21s-21e; Grand	Dry	1949	Pennsylvanian	13,767
New Mexico, Northwest	Continental 1 South Dulce, 6-28n-2w; Rio Arriba	Dry	1952		13,248
Idaho	Phillips and Utah Southern 1 Juniper, 10-14s-30e; Oneida	Dry	1952		12,844
Montana	Sun-Phillips 1 Dynneson, 32-24n-58e; Richland	Oil	1953	Red River	12,671
Arkansas	Shell 1 Browning-Burns Unit, 12-20s-23w; Columbia	Dry	1952	Smackover	12,650
Pennsylvania	The California Co. 1 Bennett; Sullivan	Dry	1951	Siluro-Ord.	12,650
Nevada	Continental and Standard of Calif. 1 Unit, 32-20n-60e; White Pine	Dry	1952		11,543
New York	N. Y. State Nat. Gas Co. 1 Kesselring, Van Etten Twp.; Chemung	Dry	1952	U. Cambrian	11,145
Michigan	Ohio and Pure 1 Reinhardt, 35-22n-2e; Ogemaw	Dry	1951	Siluro-Ord	12,343
Washington	Standard of Calif. 1 Alderwood; Snohomish	Dry	1947	Mid-Eocene	11,002
North Carolina	Standard (Jersey), Hatteras Light; Dare	Dry	1946	Granite	10,054
West Virginia	Hope Nat. Gas 8517 Gribble, Grant Dist.; Harrison	Dry	1941	Queenston	10,018
Virginia	The California Co. 1 Kipps Anth. Coal Co.; Montgomery	Dry	1949	Ordovician	9,936
South Dakota	Shell 1 Homme, 13-20n-12e; Perkins	Dry	1951	Granite	9,348
Oregon	Texas 1 Cooper Mountain, 25-1s-2w; Washington	Dry	1946		9,263
Nebraska	Stanolind 3 Lovercheck, 21-18n-55w; Banner	Dry	1952	Pre-Cambrian	8,864
Kansas	Stanolind 1 Feathers, 15-35s-33w; Seward	Gas	1947	"Crystalline"	8,243
Maryland	Snee 1 Schartzer; Garrett	Dry	1941	Helderberg	8,165
Ohio	Ohio 1-C Knowlton, Sec. 10, Indep. Twp.; Washington	Dry	1933	Clinton	7,889
Illinois	Superior 17 H. C. Ford "C" lease, New Harmony field, White	Oil	1952	Shakopee	7,682
Georgia	Stanolind 1 Pullen, Land Lot 133, Land Dist. 10; Mitchell	Dry	1944	Triassic	7,487
Arizona	Sinclair 1 Navajo Tribal; Coconino	Dry	1952	Granite	7,214
Kentucky	Pure and Ashland 1-A Walker, 22-N-24; Webster	Dry	1949	Knox	6,686
Indiana	Continental 1 Cooper Est., 13-3s-14w; Gibson	Dry	1947	Trenton	6,405
Tennessee	The California Co. 1 Beeler; Giles	Dry	1947	Granite	5,750

DEPTH CLASSIFICATIONS — 1953



Weeks Island, which is producing gas condensate from 17,039-17,122 ft. in the lower Miocene. The 2 Gonsoulin Minvielle is on the north flank of the shallow piercement-type salt dome and is a northeast stepout from the 1 Weeks Gall unit.

Richardson & Bass set a new drilling depth record for southeastern New Mexico and West Texas when 1 Harrison-Federal in Eddy County stopped drilling at 16,705 ft. The well is geologically located in the approximate center of the Delaware basin. The deepest hole in West Texas itself is now Gulf Oil Corp. 1 Northrup in Reeves County, completed dry in the Permian at 16,696 ft.

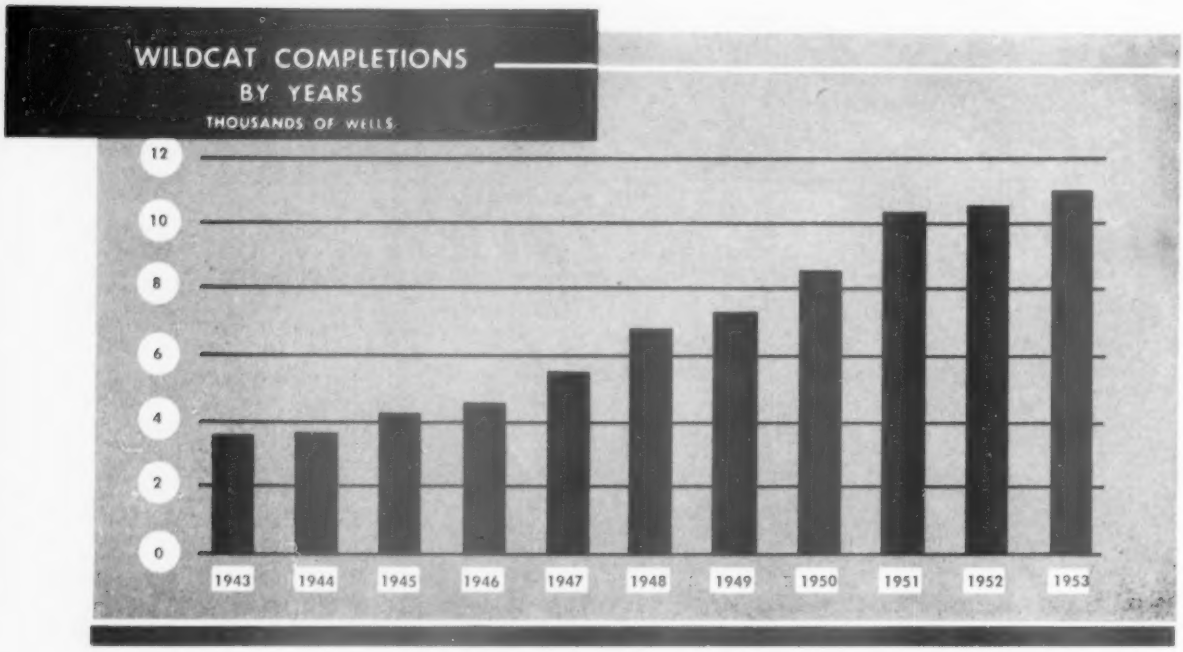
Important deep discoveries marked the year's trend toward deeper drilling in West Texas. The most significant strikes of 1953 were those in Andrews County. These found oil in the Wolfcamp of lower Permian age and in the Devonian and Ellenburger. The discovery of Magutex pool in 1952 sparked this deep development and exploratory activity.

The new phase of deep drilling is not limited to Andrews County. It is reflected in pre-Permian discoveries ranging northwest along the Central basin platform from prolific Devonian gas-distillate strikes in Pecos County, through Crane, Ector, and Gaines counties. In the Midland basin fields to the east there is an increase in deep activity, most of it in Upton and Midland counties, but Howard County exploration yielded a good Siluro-Devonian strike near Vealmoor fields and northwest Yoakum County added oil discoveries in the Silurian and Devonian.

An intensive seismic program of these areas was started in 1951.

DEPTH CLASSIFICATIONS—1953

	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	10,000-12,500 ft.	12,500-15,000 ft.	Over 15,000 ft.
Alabama	3	36	61	3	0	0	0
Arkansas	117	339	98	17	2	0	0
California	726	1,002	478	195	148	26	3
Colorado	35	172	490	35	2	0	0
Florida	2	6	16	2	1	3	0
Illinois	818	1,347	0	0	0	0	0
Indiana	1,117	163	0	0	0	0	0
Kansas	562	4,118	103	0	0	0	0
Kentucky	820	344	0	0	0	0	0
Louisiana	722	400	366	579	559	188	14
North	677	247	251	93	27	0	0
South	45	153	115	486	532	188	14
Michigan	353	236	34	0	0	0	0
Mississippi	5	29	269	64	29	1	0
Montana	114	156	76	62	13	0	0
Nebraska	9	148	162	1	0	0	0
New Mexico	282	354	431	173	118	58	2
New York	696	0	0	0	0	0	0
North Dakota	10	51	11	191	7	0	0
Ohio	596	476	8	0	0	0	0
Oklahoma	2,574	3,661	949	320	82	6	1
Pennsylvania	1,244	99	157	7	0	0	0
South Dakota	4	4	8	4	0	0	0
Texas	3,897	6,243	4,550	1,784	393	124	22
North Central (9)	1,525	1,375	735	36	3	1	0
West Central (7-B)	971	1,222	597	0	0	0	0
West (7-C & 8)	426	1,348	1,230	445	183	98	5
Panhandle (10)	83	651	22	11	3	0	0
East (5 & 6)	90	281	339	91	5	2	0
Gulf Coast (2 & 3)	210	525	795	815	153	16	6
Southwest (1 & 4)	592	841	832	386	46	7	1
Utah	11	11	31	11	6	0	0
West Virginia	322	269	25	2	0	0	0
Wyoming	112	366	361	58	19	1	0
Miscellaneous	70	15	2	0	0	1	0
Total	15,221	20,045	8,686	3,508	1,379	408	32



WILDCATS UP 4 PER CENT

Exploratory Drilling Soars to New Record

by John C. McCaslin

EXPLORATORY drilling during 1953 was expanded to new record levels with the industry reporting 11,062 wildcat completions, up more than 4 per cent over the previous year's record. Wildcat wells accounted for 22.4 per cent of all wells completed, down slightly from the previous year. In 1952 the ratio of wildcat drilling to total wells drilled was 23.1 per cent. During 1950, wildcat wells comprised only 19.9 per cent of all wells completed.

A substantial increase in total footage drilled in exploratory work was noted in 1953. This reached a record-breaking aggregate of 52,146,000 ft., as compared with 1952's 47,625,000 ft., or up more than 9 per cent.

The large increase in footage drilled was not due entirely to the greater number of wildcat wells, however, but also to the fact that the average depth of the wells was slightly greater than that of the wells drilled during the previous year. The average depth of the 1953 wildcat wells was 4,714 ft., 203 ft. deeper than the average of 4,511 ft. in 1952. The average depth of wildcats in 1951 was 4,229 ft.

Texas led with the greatest wildcat footage on record for that state. The 1953 total wildcat footage in Texas rose to 25,846,000 ft., up 2,402,000 ft. over the previous year's high. Louisiana replaced Oklahoma in second place with 4,538,000 ft., up 1,140,000 ft. over 1952. Kansas was back up to third place with 3,383,000 ft. of exploratory hole drilled. The Rocky Mountain states came into their own in 1953. Colorado was in fifth place with 1,916,000 ft. of hole, while Oklahoma dropped to fourth place with 3,304,000 ft. of wildcat hole.

Of the total wildcats drilled during the year, 1,575 were completed as new oil producers, compared to 1,488 in 1952. There were 367 new gas discoveries, compared to 268 in 1952, and 9,120 dry holes, compared to 8,796 during the previous year. These figures include not only those wildcats which opened new fields, but also those which opened new productive

U. S. EXPLORATION RESULTS IN 1953

	Total wildcats	Per cent		
		Oil	Gas	Dry
Texas	5,245	17.2	3.2	79.6
Kansas	887	10.8	4.1	85.1
Oklahoma	742	16.3	4.9	78.8
California	666	12.4	2.8	84.8
Louisiana	513	24.1	4.0	71.9
Illinois	425	3.7	0.0	96.3
Indiana	373	5.9	0.6	93.5
Colorado	364	8.2	3.3	88.5
Michigan	279	7.5	2.1	90.4
Kentucky	213	7.5	1.8	90.7
Mississippi	207	11.1	2.4	86.5
Wyoming	189	14.8	1.9	83.3
New Mexico	168	16.7	8.9	74.4
All others	791	13.4	7.0	79.6
Total 1953	11,062	14.2	3.3	82.5
Total 1952	10,552	14.1	2.5	83.4
Total 1951	10,302	14.8	2.5	82.7
Total 1950	8,554	15.1	2.6	82.3
Total 1949	7,294	14.9	2.7	82.4

horizons in or extended productive areas of existing fields.

The success ratio of wildcat wells figured 17.5 per cent, while that of 1952 figured 16.6 per cent, a gain of .9 per cent. The success ratio in 1951 figured 17.3, while the success ratio in 1950 was 17.7 per cent. Until 1953 the success ratio of wildcat wells declined slightly each year, following a trend that has been apparent for several years. Louisiana replaced Texas in first place in success ratio of wildcat wells completed, reporting 28.1 per cent of all wildcat completions as successful discoveries. Texas' success ratio was 20.4 per cent, up 3.5 per cent over the previous year.

Texas remained in first place in wildcat completions. Operators completed 5,245 exploratory tests in that state, an increase of 8 per cent over the previous year's record total. Of the total wildcats drilled in Texas during 1953, 1,073 of them were classed as new oil discoveries and gas strikes. That total includes newly opened pools, new pays, and extensions of old fields.

Kansas remained in second place with 887 wildcats finaled, up slightly over 1952. Operators in that state opened 133 new oil and gas pools. Important new producing areas were opened in the Hugoton embayment area of southwestern Kansas during the year. Fast development of prolific Greenwood pool in Morton County highlighted the state's field activity. Late in the year Pennsylvanian production was opened within the Permian producing area of vast Hugoton gas field.

The most important development in northwestern Kansas was an excellent Arbuckle discovery in Norton County. The Sedgwick basin of South-Central Kansas received two important Simpson discoveries. An active extension and discovery program was noted in the Liberal-Light area of Seward County in southwestern Kansas.

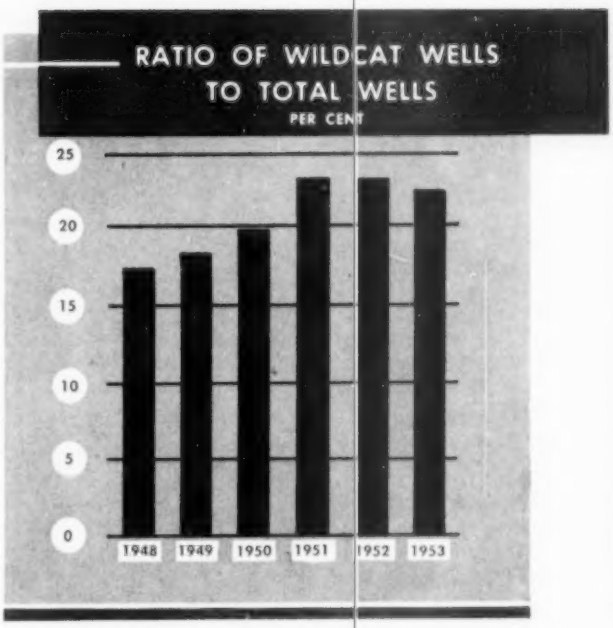
Oklahoma remained in third place in 1953. Operators completed 742 wildcats in that state during the year, up only slightly over 1952. Wildcatting netted 158 new oil and gas discoveries in that state in 1953. The state's most active areas were: Central Oklahoma, South-Central Oklahoma, the Oklahoma Panhandle, and the northern shelf of the Anadarko basin.

New discoveries in Lincoln and Logan counties highlighted Central Oklahoma activity. Garvin and McClain counties were in first place in successful wildcats in South-Central Oklahoma.

WILDCAT FOOTAGE DRILLED IN STATES WITH GREATEST WILDCAT ACTIVITY

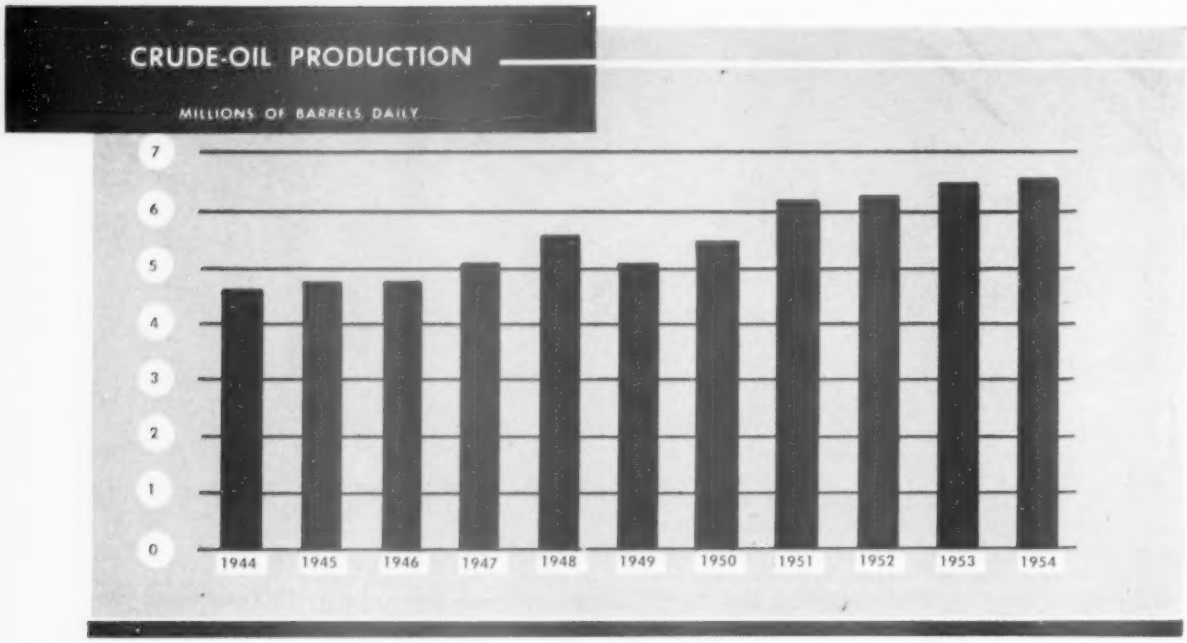
(Thousands of feet)

State—	1953	1952	1951
Texas	25,846	23,444	21,130
Louisiana	4,538	3,398	2,937
Kansas	3,383	3,292	3,659
Oklahoma	3,304	3,452	3,523
Colorado	1,916	1,278	735
Mississippi	1,468	1,327	1,274
Illinois	938	1,544	2,148
Wyoming	936	858	696
Nebraska	804	732	637
Montana	766	508	164
Michigan	701	642	777
Indiana	593	782	1,000
North Dakota	463	254	65
All others	6,490	6,114	4,824
Total United States	52,146	47,625	43,569



WILDCAT COMPLETIONS BY STATES

State—	Comp.	Oil	Gas	Dry
Alabama	75	1	0	74
Arkansas	140	12	0	128
California	666	83	19	564
Colorado	364	30	12	322
Florida	30	0	0	30
Illinois	425	16	0	409
Indiana	373	22	2	349
Kansas	887	96	37	754
Kentucky	213	15	4	194
Louisiana	513	124	21	368
North	177	13	4	160
South	336	111	17	208
Michigan	279	21	6	252
Mississippi	207	23	5	179
Montana	126	12	0	114
Nebraska	161	21	5	135
New Mexico	168	28	15	125
North Dakota	91	11	1	79
Ohio	22	2	6	14
Oklahoma	742	121	37	584
Pennsylvania	20	0	4	16
South Dakota	20	0	0	20
Texas	5,245	904	169	4,172
North Central (9)	1,058	230	8	820
West Central (7-B)	1,062	213	11	838
West (7-C & 8)	876	180	13	683
Panhandle (10)	26	2	0	24
East (5 & 6)	300	29	5	266
Gulf Coast (2)	369	41	26	302
Gulf Coast (3)	519	89	47	383
Southwest (1)	432	29	10	393
Southwest (4)	603	91	49	463
Utah	42	3	4	35
West Virginia	23	0	13	10
Wyoming	189	28	3	158
Miscellaneous	41	2	4	35
Total 1953	11,062	1,575	367	9,120
Total 1952	10,552	1,488	268	8,796



INCREASE OF 3 PER CENT

Production Nears 6½ Million Barrels

by John C. McCaslin

PRODUCTION of crude oil and lease condensate in the United States climbed to a new record high during 1953.

Averaging 6,460,000 bbl. daily, crude-oil and lease-condensate production for the year was 206,000 bbl. daily higher than during 1952. Total production for the year climbed to 2,357,900,000 bbl., an increase of 68,946,000 bbl. This 3 per cent gain compared with the 2 per cent gain of 1952 over 1951, and the 13.5 per cent gain between 1950 and 1951.

Daily average production in the United States exceeded 6,100,000 for each month of the year except October, when a low of 5,995,250 bbl. daily was recorded during the latter part of the month. The highest point reached during the year was during the week of August 29 when daily average production reached 6,580,450 bbl.

New production records were reached in 12 states. Alabama production soared to 1,705,000 bbl. cumulative during the year, or 4,671 bbl. daily. California production was well over the 1,000,000-bbl. per day mark all year. Demands in California, the nation's second-biggest producing state, have been greater than supply during the better part of the past 3 years. With the decreasing demand for California crude by the military in the past 18 months plus the ever-increasing development activity in the state's new and old fields, California crude stocks are steadily reaching healthy marks.

New Record in Rockies

Perhaps the most significant production increase in the nation was noted in the Rocky Mountain states. Colorado enjoyed an all-time high at 97,126 bbl. daily, or a year's total of 35,451,000 bbl. New discoveries and subsequent rapid development in the Denver-Julesburg basin plus the completion of the Platte Pipe Line which is carrying ever-increasing amounts of crude from Wyoming and Denver-Julesburg fields to eastern refinery centers, brought about this Colorado record. Also up was Nebraska, which reported a total of 5,125,000 bbl. for the year, or a new high of 14,041 bbl. daily. The influence of the Platte Pipe Line boosted Wyoming's daily average production to 226,663 bbl. daily, or a year's total of 82,732,000 bbl.

Wyoming enjoyed one of the most active years in its long oil-producing history in 1953. With the added outlet furnished by the new pipe line, development activity in the state's big fields soared to new highs. The incentive for increased production also boosted exploratory activity in the big state.

North Dakota crude-oil production was 5,068,000 bbl. in 1953, up considerably over the previous year. The newest oil-producing state can expect a rapid increase in 1954 and 1955 with the completion of added outlet facilities and the construction of refineries to handle Williston basin crude oil.

In the 2 years since discovery of oil in the Williston basin records have shown that Montana, Saskatchewan, Manitoba, and North Dakota have made rapid gains in the number of wells drilled and in production. Montana reported a total production of 11,874,000 bbl. in 1953, up 2,298,000 bbl. over 1952.

New Mexico and Utah both reported new records during the year. New Mexico crude and lease-condensate production jumped to 192,989 bbl. daily in 1953.

United States Production of Crude Oil and Lease Condensate

(Thousands of barrels)

	1953 prod. change	1953	1952	1951	1950	1949	1948	1947	Cum. prod.
Alabama	+ 686	1,705	1,019	1,020	735	462	466	396	6,407
Arkansas	— 1,097	28,454	29,551	29,798	31,108	29,986	31,682	29,948	883,905
California	+ 6,029	365,444	359,415	354,561	327,607	332,942	340,074	333,132	9,699,018
Colorado	+ 6,298	35,451	29,153	27,823	23,303	23,587	17,862	15,702	239,421
Dakotas	+ 3,519	5,068	1,549	25					6,642
Florida	— 63	528	591	596	487	441	290	259	3,295
Illinois	— 163	58,585	58,748	60,243	62,028	64,501	64,808	66,459	1,683,892
Indiana	+ 602	12,669	12,067	11,100	10,699	9,696	6,974	6,095	236,559
Kansas*	— 196	114,648	114,844	113,965	107,595	100,230	108,119	104,039	2,430,259
Kentucky†	— 1,272	10,781	12,053	11,636	10,381	8,821	8,820	9,405	286,734
Louisiana	+11,813	253,749	241,936	232,281	208,965	190,826	181,458	160,128	3,288,982
Michigan	— 923	12,327	13,250	13,927	15,826	16,517	16,871	16,215	361,751
Mississippi	— 137	36,102	36,239	37,039	38,236	37,966	45,761	34,925	393,439
Montana	+ 2,298	11,874	9,576	8,958	8,109	9,118	9,382	8,742	198,659
Nebraska	+ 2,623	5,125	2,502	2,558	1,547	330	215	229	17,569
New Mexico	+11,304	70,441	59,137	52,719	47,367	47,645	47,969	50,926	864,692
New York	— 491	3,771	4,262	4,254	4,143	4,425	4,621	4,762	189,426
Ohio	+ 343	3,557	3,214	3,140	3,383	3,483	3,600	3,108	630,910
Oklahoma	+13,313	202,876	189,563	184,434	163,808	150,804	155,231	142,001	6,778,021
Pennsylvania	— 517	10,641	11,158	11,345	11,859	11,374	12,667	12,690	1,158,278
Texas	+ 165	1,026,536	1,026,371	1,010,270	829,874	744,834	903,498	820,210	16,786,036
Utah	+ 51	1,788	1,737	1,305	1,228	637	16		6,711
Virginia	+ 1	11	10	12	21	43	33	61	209
West Virginia	+ 455	3,037	2,582	2,757	2,808	2,839	2,692	2,617	449,336
Wyoming	+14,305	82,732	68,427	68,929	61,631	47,890	55,032	44,772	1,135,886
Total U. S.	+68,946	2,357,900	2,288,954	2,244,695	1,972,748	1,839,397	2,018,141	1,856,821	47,736,037
Daily avg.	+ 206	6,460	6,254	6,150	5,405	5,039	5,514	5,087	

*Includes Missouri. †Includes Tennessee.

CRUDE-OIL PRODUCTION RECORDS BY STATES

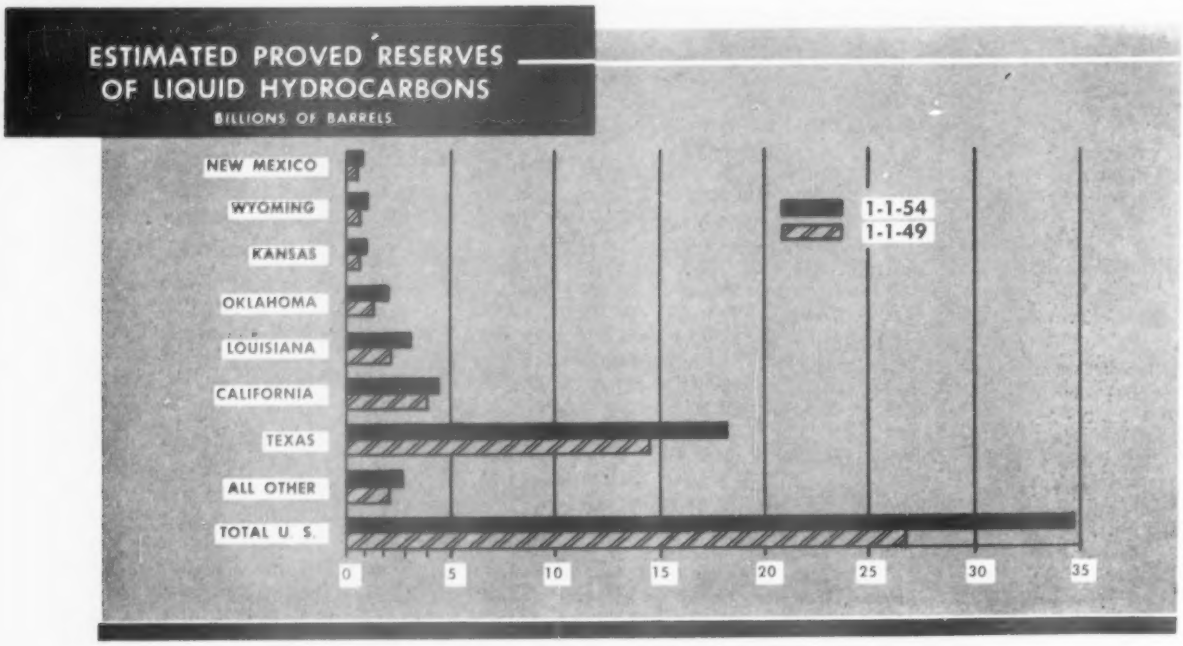
(Thousands of barrels)

	Record year		Production in record year
Alabama	1953		1,705
Arkansas		1925	77,398
California	1953		365,444
Colorado	1953		35,451
Florida		1951	596
Illinois		1940	147,647
Indiana	1953		12,669
Kansas*		1952	114,845
Kentucky†		1952	11,790
Louisiana	1953		253,749
Michigan		1939	23,462
Mississippi		1948	45,761
Montana	1953		11,874
Nebraska	1953		5,125
New Mexico	1953		70,441
New York		1882	6,685
North Dakota	1953		5,068
Ohio		1896	23,941
Oklahoma		1927	277,775
Pennsylvania		1891	31,424
Texas	1953		1,026,536
Utah	1953		1,788
Virginia		1947	61
West Virginia		1900	16,196
Wyoming	1953		82,732

*Includes Missouri. †Includes Tennessee.

PRODUCTION—DAILY AVERAGE PER WELL

	Bbl. daily 1953	Producing wells	Daily avg. per well
Alabama	4,671	112	41.7
Arkansas	77,956	4,122	18.9
California	1,001,216	32,146	31.1
Colorado	97,126	1,209	80.3
Florida	1,440	12	120.0
Illinois	160,507	34,786	4.6
Indiana	34,709	1,483	2.3
Kansas	314,104	33,184	9.5
Kentucky	29,537	16,369	1.8
Louisiana	695,203	14,540	47.8
Michigan	33,778	3,982	8.5
Mississippi	98,909	1,438	68.8
Montana	32,532	3,478	9.4
Nebraska	14,041	478	29.4
New Mexico	192,989	7,015	27.5
New York	10,331	17,000	0.6
North Dakota	13,885	242	57.4
Ohio	9,745	19,200	0.5
Oklahoma	555,825	63,126	8.8
Pennsylvania	29,153	56,000	0.5
Texas	2,812,427	142,271	19.8
Utah	4,899	69	71.0
West Virginia	8,321	14,600	0.6
Wyoming	226,663	5,147	44.0
Miscellaneous	33	140	0.2
Total U. S.	6,460,000	472,149	13.7



34.64 BILLION BARRELS

U. S. Reserves Show 901-Million-Barrel Gain

ESTIMATES of proved reserves of liquid hydrocarbons (crude oil and natural-gas liquids) in the United States stood at 34,636 million barrels at the beginning of 1954, 901 million barrels higher than at the first of 1953.

Production of liquid hydrocarbons during 1953 was 2,637 million barrels which meant that it took the recognition of 3,538 million barrels of liquids proved to be recoverable under existing economic conditions to establish the new estimate of remaining reserves.

None of last year's discoveries have yet been recognized as having opened exceptionally large fields to account for the higher estimate of remaining reserves. By far the major portion of the net 901 million barrels which entered the proved category during 1953 came from upward revisions of estimates for fields discovered prior to 1953.

These upward revisions were the result of:

1. Increased productive area assigned to recent-year discoveries that have seen sufficient additional drilling to prove the estimate at the first of 1953 was low. (Reserve estimates made early in the life of a pool are nearly always conservative when prepared for industry-wide compilations. Sizable pools normally require several years of drilling before a near-true picture of the reservoir's ultimate potentialities is acceptable for such compilations.)

2. Increased productive area assigned to old "established" pools because of successful nibbling at the pools' edges.

3. Increased recovery per acre estimates for settled producing fields because of (a) better-than-expected natural performance, (b) definite results of fluid-injection projects, and (c) stimulation of marginal-production areas by formation fracturing.

The 377 million barrels of liquids credited to new-pool wildcat drilling during 1953 is little more than a token figure. It will be revised upward as future drilling and well performance of the new pools of 1953 supply the information needed for more representative estimates. The estimate for new oil in 1953 is considerably lower than in recent years because

ESTIMATED PROVED RESERVES OF TOTAL LIQUID HYDROCARBONS IN THE UNITED STATES
(Millions of barrels)

State—	Jan. 1, 1954	Jan. 1, 1953	Change
Arkansas	369	335	34
California	4,578	4,529	49
Colorado	325	316	9
Illinois	615	611	4
Kansas	1,270	1,170	100
Kentucky	82	77	5
Louisiana	3,202	3,050	152
Michigan	90	81	9
Mississippi	435	460	— 25
Montana	185	175	10
New Mexico	963	930	33
North Dakota	215	124	91
Oklahoma	2,270	2,280	— 10
Pennsylvania	115	125	— 10
Texas	18,365	18,204	161
West Virginia	67	74	— 7
Wyoming	1,265	985	280
Others	225	209	16
Total United States	34,636	33,735	901

Estimated Proved Reserves of Crude Oil in the United States

(Thousands of barrels)

State—	Proved reserves 1-1-53	1953 discoveries	Extensions and revisions	1953 production	Proved reserves As of 1-1-54	Year's change	Per cent of U. S.
Alabama	10,000	0	1,705	1,705	10,000	0	
Arkansas	285,000	2,000	60,245	28,245	319,000	34,000	1.1
California total	4,165,000	25,000	403,444	365,444	4,228,000	63,000	14.3
Coastal	842,000	13,000	117,044	94,044	878,000	36,000	3.0
Los Angeles	1,219,000	4,000	136,165	120,165	1,239,000	20,000	4.2
San Joaquin	2,104,000	8,000	150,235	151,235	2,111,000	7,000	7.1
Colorado	300,000	15,000	30,451	35,451	310,000	10,000	1.1
Illinois	585,000	1,000	62,585	58,585	590,000	5,000	2.0
Indiana	55,000	3,000	14,669	12,669	60,000	5,000	0.2
Kansas	1,010,000	27,000	177,613	114,613	1,100,000	90,000	3.7
Kentucky	65,000	4,000	13,771	10,771	72,000	7,000	0.2
Louisiana total	2,400,000	41,000	300,377	239,377	2,502,000	102,000	8.4
North	447,000	5,000	100,577	40,577	512,000	65,000	1.7
South	1,953,000	36,000	199,800	198,800	1,990,000	37,000	6.7
Michigan	80,000	200	22,127	12,327	90,000	10,000	0.3
Mississippi	405,000	5,000	4,365	34,365	380,000	— 25,000	1.3
Montana	170,000	6,000	15,874	11,874	180,000	10,000	0.6
Nebraska	18,000	3,000	12,125	5,125	28,000	10,000	0.1
New Mexico	780,000	25,000	68,287	70,287	803,000	23,000	2.7
New York	53,000	0	—229	3,771	49,000	— 4,000	0.2
North Dakota	124,000	700	95,367	5,067	215,000	91,000	0.7
Ohio	26,000	100	3,457	3,557	26,000	0	0.1
Oklahoma	1,980,000	25,000	167,876	202,876	1,970,000	— 10,000	6.7
Pennsylvania	122,000	0	641	10,641	112,000	— 10,000	0.4
Texas total	15,404,000	118,000	803,790	1,010,790	15,315,000	— 89,000	51.7
East	3,040,000	1,000	12,440	153,440	2,900,000	—140,000	9.8
Gulf Coast	3,292,000	20,000	232,013	219,013	3,325,000	33,000	11.2
North	1,110,000	10,000	190,980	110,980	1,200,000	90,000	4.0
Panhandle	345,000	2,000	56,013	28,013	375,000	30,000	1.3
Southwest	1,425,000	15,000	88,271	108,271	1,420,000	— 5,000	4.8
West	6,192,000	70,000	224,073	391,073	6,095,000	— 97,000	20.6
Utah	40,000	500	3,288	1,788	42,000	2,000	0.1
West Virginia	38,000	0	2,037	3,037	37,000	— 1,000	0.1
Wyoming	925,000	17,000	340,732	82,732	1,200,000	275,000	4.0
Fla., Mo., S. D., Tenn., Va.	4,000	500	1,085	585	5,000	1,000	
Total United States	29,044,000	319,000	2,605,682	2,325,682	29,643,000	599,000	100.0

Estimated Proved Reserves of Natural-Gas Liquids in the United States

Includes Condensate, Natural Gasoline, and Liquefied Petroleum Gases

(Thousands of barrels)

State—	Proved reserves 1-1-53	1953 discoveries	Extensions and revisions	1953 production	Proved reserves As of 1-1-54	Year's change	Per cent of U. S.
Arkansas	50,000	80	1,405	1,485	50,000	0	1.0
California	364,000	1,000	15,895	30,895	350,000	— 14,000	7.0
Colorado	16,000	100	—530	570	15,000	— 1,000	0.3
Illinois	26,000	20	2,165	3,185	25,000	— 1,000	0.5
Kansas	160,000	400	16,315	6,715	170,000	10,000	3.4
Kentucky	12,000	80	—105	1,975	10,000	— 2,000	0.2
Louisiana	650,000	9,000	83,185	42,185	700,000	50,000	14.0
Mississippi	55,000	1,000	3,420	4,420	55,000	0	1.1
Montana	5,000	600	—380	220	5,000	0	0.1
Nebraska	2,500	100	600	200	3,000	500	0.1
New Mexico	150,000	3,000	18,030	11,030	160,000	10,000	3.2
Oklahoma	300,000	4,000	23,630	27,630	300,000	0	6.0
Texas	2,800,000	38,000	383,075	171,075	3,050,000	250,000	61.1
West Virginia	36,000	100	1,125	7,225	30,000	— 6,000	0.6
Wyoming	60,000	800	6,660	2,460	65,000	5,000	1.3
Others	4,500	50	735	285	5,000	500	0.1
Total United States	4,691,000	58,330	555,225	311,555	4,993,000	302,000	100.0

Giant Fields* vs. All Fields

Crude, Condensate, and Cycled Products
(Millions of barrels)

State—	Number giants	1953 production — All fields	1953 production — Giant fields	1953 production — Giants' per cent	Estimated ultimate† — All fields	Estimated ultimate† — Giant fields	Estimated ultimate† — Giants' per cent	Remaining reserves — All fields	Remaining reserves — Giant fields	Remaining reserves — Giants' per cent
Texas	62	1,054.84	498.47	47.3	33,132	19,894	60.0	16,073	9,350	58.2
California	38	367.82	279.77	76.1	14,000	11,725	83.8	4,272	3,308	77.4
Oklahoma	22	202.88	90.42	44.6	8,748	4,648	53.1	1,970	1,031	52.3
Louisiana	‡15	266.02	‡74.76	28.1	6,209	‡2,182	35.1	2,792	‡866	31.0
Kansas	6	114.61	28.91	25.2	3,530	1,065	30.2	1,100	329	29.9
New Mexico	4	70.44	25.93	36.8	1,665	800	48.1	803	340	42.3
Colorado	1	35.45	22.95	64.7	549	350	63.8	310	207	66.8
Wyoming	§5	82.73	§21.96	26.5	2,336	§1,050	45.0	1,200	§408	34.0
Illinois	5	58.59	20.43	34.9	2,274	1,320	58.1	590	351	59.5
N. Y.-Pa.	2	14.41	12.19	84.6	1,509	842	55.8	161	133	82.6
Mississippi	3	37.10	11.15	30.1	820	385	47.0	420	174	41.4
Arkansas	3	29.73	10.06	33.8	1,232	726	58.9	335	140	41.8
Montana	1	11.87	2.85	24.0	379	110	29.0	180	35	19.4
North Dakota	1	5.07	3.01	59.4	221	140	63.4	215	136	63.3
Other states	0	51.56	0	0	2,370	0	0	370	0	0
Total United States	168	2,403.12	1,102.86	45.9	78,974	45,237	57.3	30,791	16,808	54.6

*Fields with estimated ultimate recovery of 100 million barrels or more. †Accumulated production to January 1, 1954, plus estimated proved reserves. ‡Includes all Rodessa field. §Includes all of Elk Basin field.

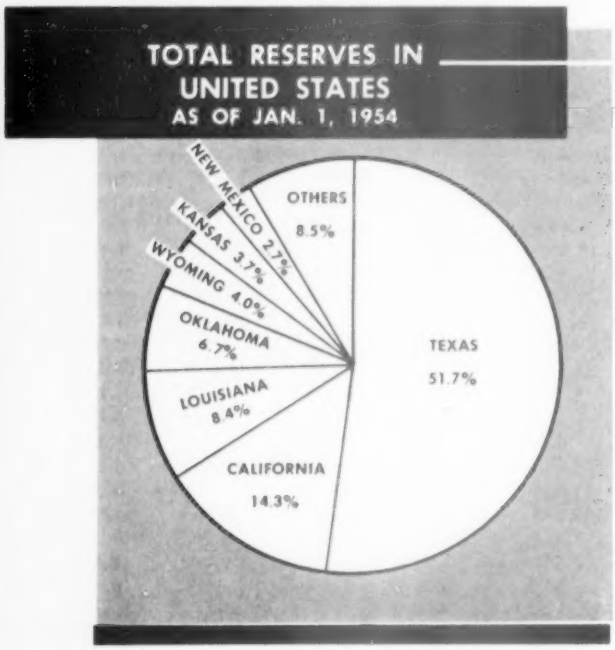
there were no large discoveries recognized. Only a few of the numerous geologically significant discoveries, some of which may ultimately be found to have opened big pools, have had sufficient confirmation drilling to indicate their true economic value.

Estimates of proved remaining reserves of liquid hydrocarbons do not include oil that may be produced by processing oil shales.

Proved reserves of crude oil in the United States as of January 1, 1954, are estimated at 29,643 million barrels. This figure amounts to 599 million barrels more than estimated for the beginning of 1952.

Though the estimate for the remaining reserve in Texas is down a little from last year's estimate, the state still has more than 50 per cent of the proved reserve of the entire United States. While there were no discoveries in Texas which resulted in tremendous drilling booms, there were many significant discoveries completed on and immediately to the east of the Central basin platform of West Texas.

The greatest increase in reserve estimates came in Wyoming where a net 275 million barrels of oil was added as a result of new-field discoveries, deeper-pool discoveries, and more optimistic predictions for the productive ability of many of the older fields.



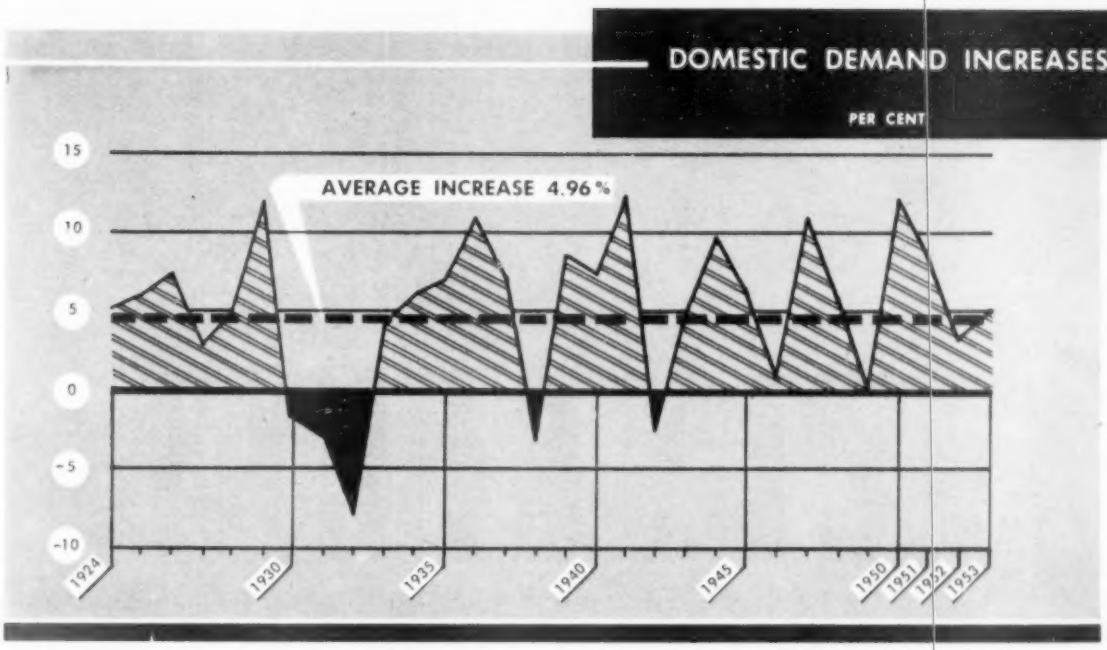
Natural-Gas Liquids

Natural-gas liquids include natural gasoline, condensate, and liquefied petroleum gases (heavier components of natural gas). A large portion, but not all, of the liquefiable petroleum gases which are produced are collected at field separators, scrubbers, gasoline plants, or cycling plants.

The estimate of 4,993 million barrels of recoverable reserves of natural-gas liquids in the United States at the beginning of 1954 is 302 million barrels higher than the estimate of 1 year ago. Both this year's estimate and that for last year include estimates of remaining reserves of liquids in the gaseous state in those reservoirs which are produced without the gas being thoroughly stripped.

Of the estimated 79,000 million barrels of oil (crude, lease condensate, and cycled products) discovered in the United States to the end of 1953, 57.3 per cent is credited to only 168 fields, all of which have an estimated ultimate recovery of at least 100 million barrels.

These 168 fields are marked with asterisks in the tabulations of production and estimates of proved remaining reserves for the United States' larger producing fields, which begin on page 210 of this issue.



DEMAND TO RISE 5 PER CENT

U.S. Needs Will Exceed 8 Million Barrels Daily

by John C. Casper

DOMESTIC demand for all petroleum products will gain about 5.1 per cent in 1954 which is in line with the average annual gain over the past 30 years. However, part of the increase this year will be due to the fact that the gain will be calculated from a smaller base demand in 1953 than would have been the case if the weather had been near normal in the first and fourth quarters of the year.

Total domestic demand for 1954 is forecast at 8,014,000 bbl. daily compared with an estimated 7,624,000 bbl. daily for 1953. The increase of 5.1 per cent, forecast for 1954, compares with an actual gain of about 4.7 per cent in 1953. The larger increase for 1954 is not based on a larger increase in potential in 1954 than in 1953 but on the reduced base demands in 1953 because of very warm weather in the winter quarters.

At the end of the third quarter, industry economists were estimating total domestic demand for 1953 at about 7,725,000 bbl. daily, based on near-normal weather in the last quarter. This earlier forecast for 1953 represented a gain of 6.1 per cent over 1952, and if demand had reached this total, the present forecast for 1954 would be up only 3.7 per cent.

The influence of abnormal weather conditions is further shown by a comparison of percentage increases in heating-oil demands in 1953 with those forecast for 1954.

Warmer-than-normal weather in North Central and East Coast areas during the winter quarters of 1953 resulted in a decrease in domestic demand for kerosine and a very small increase of only 2.6 per cent for distillate fuels. If the totals for kerosine and distillate are combined, the increase for middle distillate was only 1.5 per cent over 1952. Even this percentage is high since the base figure for 1952 was estimated to be about 70,000 to 75,000 bbl. daily below normal because of warm weather.

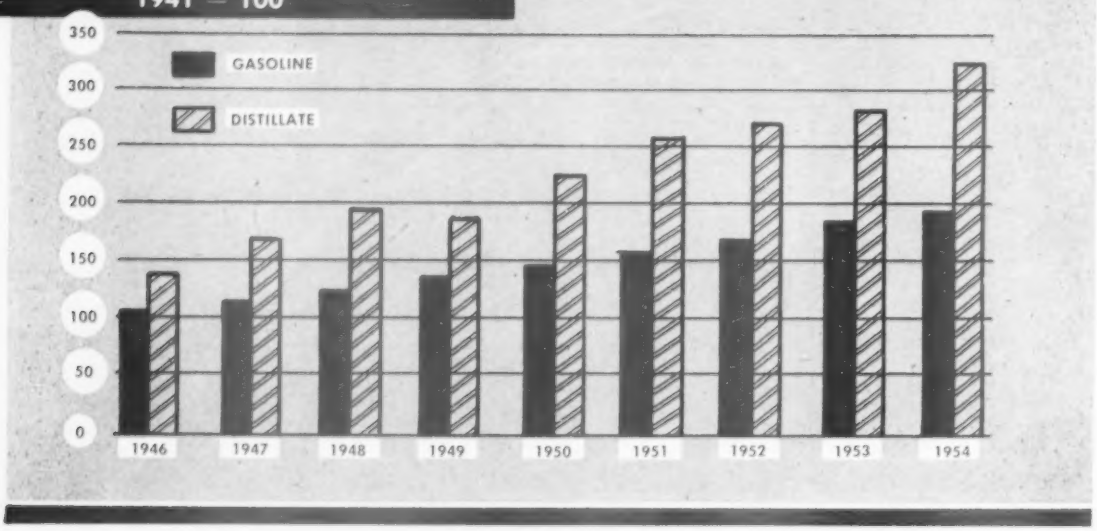
Most industry economists are giving some consideration in their forecasts to the apparent trend toward warmer weather in recent years. Some estimates for 1954 are based on calculations using weather about 2 or 3 per cent warmer than the revised normal. This forecast also makes some allowance for the trend.

Nearly 7 Million Oil Heating Units

Even though sales of oil burners in 1954 will be less than in 1953, the average number in use will be up about 7 or 8 per cent. Consumption by these new customers plus gains in consumption by old customers with near-normal weather will account for the large percentage increase in distillate demand this year. The number of central heating units using oil at the end of 1953 was estimated at about 6,900,000.

These forecasts assume a slight dip in over-all business conditions in 1954. Industrial production, measured by the Federal Reserve Board index, is expected to be about 10 per cent lower than in 1953. Gross natural product will be down by about 5 or 6 per cent. Sales of new automobiles may drop as much as 12 per cent, but the net increase in total motor-vehicle registrations is expected to be about 1,600,000 for the year. Military purchases of petroleum products will be less than in 1953.

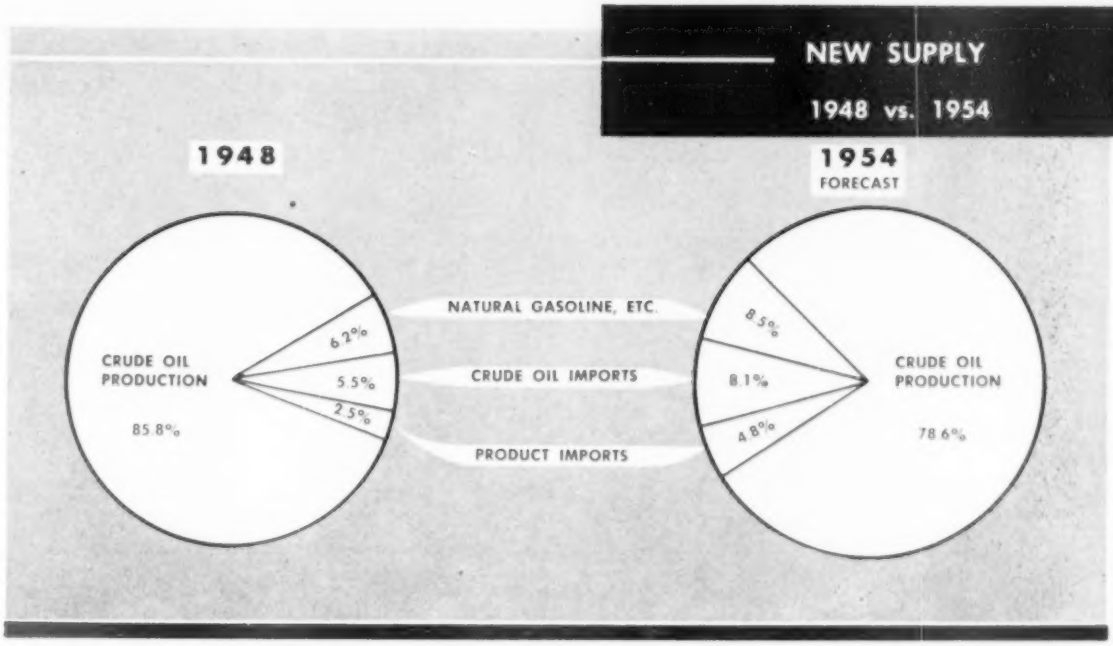
INDEXES OF DOMESTIC DEMAND
GASOLINE AND DISTILLATE
1941 = 100



1954 Supply and Demand by Quarters

(Thousands of barrels daily)

	First quarter		Second quarter		Third quarter		Fourth quarter	
	Volume	Per cent increase over 1953	Volume	Per cent increase over 1953	Volume	Per cent increase over 1953	Volume	Per cent increase over 1953
Domestic demand	**8,561**	**6.3**	**7,482**	**1.8**	**7,495**	**3.4**	**8,525**	**8.7**
Gasoline	3,180	4.4	3,680	3.8	3,755	5.2	3,445	3.2
Kerosine	518	8.3	212	— 1.8	225	10.5	505	17.2
Distillate	2,125	14.4	1,110	3.6	1,020	8.9	1,890	24.2
Residual	1,760	— 0.3	1,405	— 5.3	1,310	— 3.9	1,625	5.0
Lubricants	105	2.8	125	7.9	125	3.5	120	8.1
Other products	845	8.4	930	3.4	1,040	0.7	915	5.2
Crude loss	28	— 2.4	20	—10.7	20	—12.7	25	— 7.4
Exports	**350**	**—17.9**	**339**	**—22.1**	**303**	**—16.0**	**292**	**—13.1**
Gasoline	85	—17.8	90	—14.6	85	—21.4	75	— 7.4
Kerosine	14	—24.7	14	—48.3	12	—23.1	12	—20.0
Distillate	80	—24.0	70	—29.6	60	—10.4	65	—11.0
Residual	60	—12.2	55	—23.6	45	—35.3	45	—37.5
Lubricants	34	8.3	35	2.0	32	—11.1	30	—18.9
Other products	22	—22.5	25	— 9.7	24	— 2.4	20	— 9.1
Crude	55	—22.5	50	—27.4	45	13.1	45	25.0
Total demand	**8,911**	**5.0**	**7,821**	**0.5**	**7,798**	**2.5**	**8,817**	**7.8**
Gasoline	3,265	3.6	3,770	3.3	3,840	4.5	3,520	3.0
Kerosine	532	7.1	226	— 5.6	237	8.1	517	15.9
Distillate	2,205	12.4	1,180	0.8	1,080	7.6	1,955	22.6
Residual	1,820	— 0.7	1,460	— 6.1	1,355	— 5.4	1,670	3.2
Lubricants	139	4.1	160	6.6	157	0.1	150	1.4
Other products	867	7.3	955	3.0	1,064	0.6	935	4.8
Crude loss and export	83	—16.8	70	—23.3	65	3.6	70	11.1
Stock change	**—544**		**+454**		**+397**		**—292**	
Crude	— 94		+ 94		+ 22		— 10	
Products	—450		+360		+375		—282	
New supply	**8,367**	**0.6**	**8,275**	**1.3**	**8,195**	**0.2**	**8,525**	**6.3**
Imports	**1,140**	**3.1**	**1,000**	**— 4.8**	**1,005**	**3.8**	**1,160**	**5.0**
Crude	640	3.2	670	— 1.4	690	3.9	700	8.5
Products	500	3.0	330	—11.0	315	3.7	460	0.0
Production	**7,227**	**0.3**	**7,275**	**2.1**	**7,190**	**— 0.8**	**7,365**	**6.5**
Crude	6,517	— 0.5	6,595	1.8	6,490	— 1.4	6,625	6.3
Natural gasoline, etc.	710	7.7	680	5.2	700	5.5	740	8.8
Crude run to stills	**7,145**	**2.0**	**7,079**	**1.8**	**7,070**	**— 0.4**	**7,242**	**4.2**



Warmer-than-normal weather in the winter quarters of 1953 gave an additional boost to gasoline demand. Domestic demand for 1953 is estimated at 3,376,000 bbl. daily for an increase of 7.0 per cent. Since the gain for 1954 will be calculated from this abnormally high level and since the net addition to total motor vehicles on the road will be less than in 1953, an increase of only 4.1 per cent is forecast for 1954. Gasoline exports may be off as much as 15 per cent for a net gain in total gasoline demand of 3.6 per cent.

Changes in industrial production have more effect on demand for residual fuel than on demand for any other petroleum product. Domestic demand for residual in 1954 is forecast at 1,524,000 bbl. daily, or a reduction of 1.0 per cent. If weather for the year is near normal, domestic demand for distillate will be greater than for residual for the first time.

Large increases in crude and product stocks for the past 2 years have built inventories high enough to meet the distribution needs for 1954. For this reason, only minor stock additions are included this year.

Crude and product stocks at the start of 1953 were 6.3 per cent higher than at the start of the previous year, but total demand for the year increased only 3.8 per cent. Stocks at the start of 1954 are up 9.0 per cent which seems to be more than will be needed to supply the extra working stocks for a forecast increase in demand of 4.0 per cent.

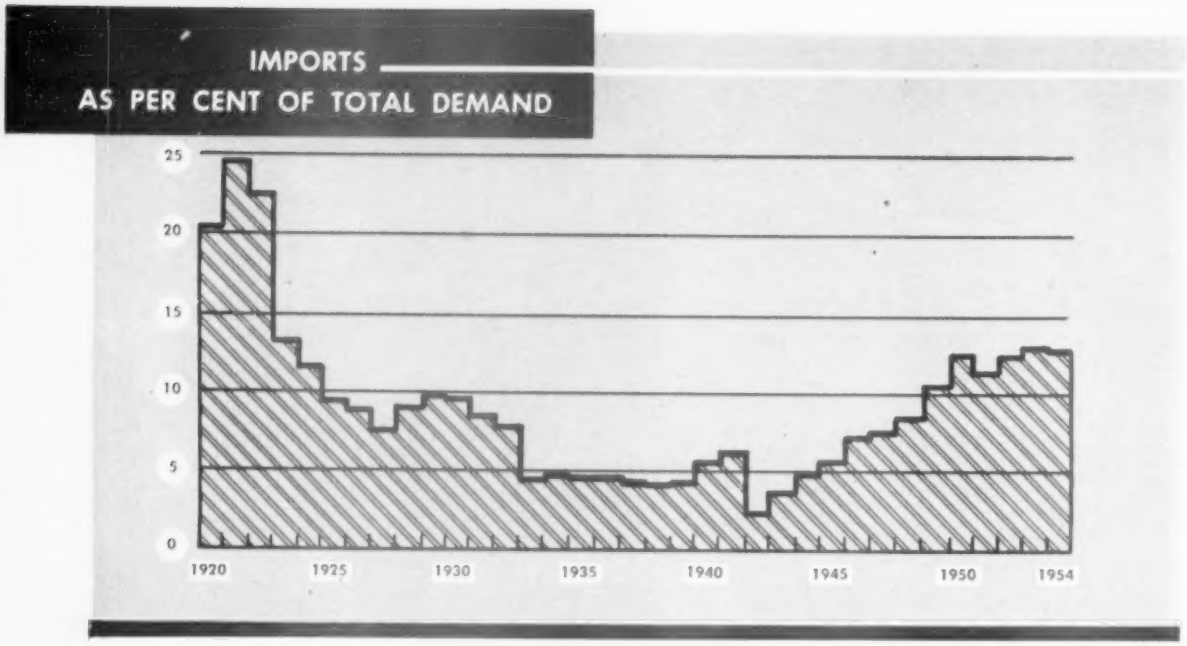
Since an abnormally large part of the supply in 1953 went to storage, the increase in new supply for the year was greater than the increase in total demand. The gain in total production was 3.7 per cent compared with a gain of 3.8 per cent in total demand. Imports were up 10.4 per cent, boosted by the big increase in crude imports on the West Coast.

Some of the material needed to meet this year's demand was produced or imported last year. This advance stocking accounts for a forecast increase in new supply of only 2 per cent to meet a total demand increase of 4.0 per cent.

SUPPLY AND DEMAND—1954 VS. 1953
(Thousands of barrels daily)

	1954 forecast		*1953	
	Volume	Per cent increase over 1953	Volume	Per cent increase over 1952
Domestic demand	**8,014**	**5.1**	**7,624**	**4.7**
Gasoline	3,516	4.1	3,376	7.0
Kerosine	365	10.3	331	— 2.8
Distillate	1,534	14.1	1,345	2.6
Residual	1,524	— 1.0	1,539	1.3
Lubricants	119	6.3	112	7.5
Other products	933	4.1	896	7.9
Crude loss	23	— 8.0	25	8.7
Exports	**321**	**—17.5**	**389**	**—10.8**
Gasoline	84	—15.2	99	— 1.7
Kerosine	13	—31.6	19	—12.8
Distillate	68	—20.9	86	— 7.2
Residual	51	—27.1	70	— 8.3
Lubricants	33	— 5.7	35	—20.3
Other products	23	—11.5	26	— 5.5
Crude	49	— 9.3	54	—26.0
Total demand	**8,335**	**4.0**	**8,013**	**3.8**
Gasoline	3,600	3.6	3,475	6.8
Kerosine	378	8.0	350	— 3.4
Distillate	1,602	11.9	1,431	2.0
Residual	1,575	— 2.1	1,609	0.9
Lubricants	152	3.4	147	— 0.7
Other products	956	3.7	922	7.5
Crude loss and export	72	— 8.9	79	—17.7
Stock change	**+5**		**+166**	
Crude	+3		+ 9	
Products	+2		+157	
New supply	**8,340**	**2.0**	**8,179**	**4.5**
Imports	**1,076**	**1.8**	**1,057**	**10.4**
Crude	675	3.5	652	13.9
Products	401	— 1.0	405	5.3
Production	**7,264**	**2.0**	**7,122**	**3.7**
Crude	6,557	1.5	6,460	3.2
Natural gasoline, etc.	707	6.8	662	9.4
Crude run to stills	**7,134**	**1.9**	**7,002**	**5.0**

*Partly estimated.



MILLION BARRELS PER DAY

Imports 13.2 Per Cent of Total U.S. Demand

by Henry D. Ralph

IMPORTS of foreign oil were a hot subject of debate by the industry all through 1953, so here's the Journal's analysis of what actually happened and our forecast of 1954.

Total imports—crude and products—averaged 1,057,000 bbl. per day last year. This was 13.2 per cent of the total United States demand for all oils—the highest ratio since the early 1920's.

This year imports will increase by about 19,000 bbl. per day, according to Journal estimates based on various sources including confidential forecasts of many of the major companies. However, over-all demand will go up too, so that imports of 1,076,000 bbl. per day will equal 12.9 per cent of demand. As we see it, imports of crude will go up by 23,000 bbl. per day to average 675,000 bbl. per day during 1954, while imports of products will drop by 4,000 bbl. per day to average 401,000 bbl. daily.

Last year's imports were the highest on record, and were 100,000 bbl. per day higher than in 1952. Product imports of 405,000 bbl. per day were 21,000 bbl. per day higher than in 1952. By far the greater portion of this was residual fuel oil, used almost entirely close to Atlantic Seaboard ports.

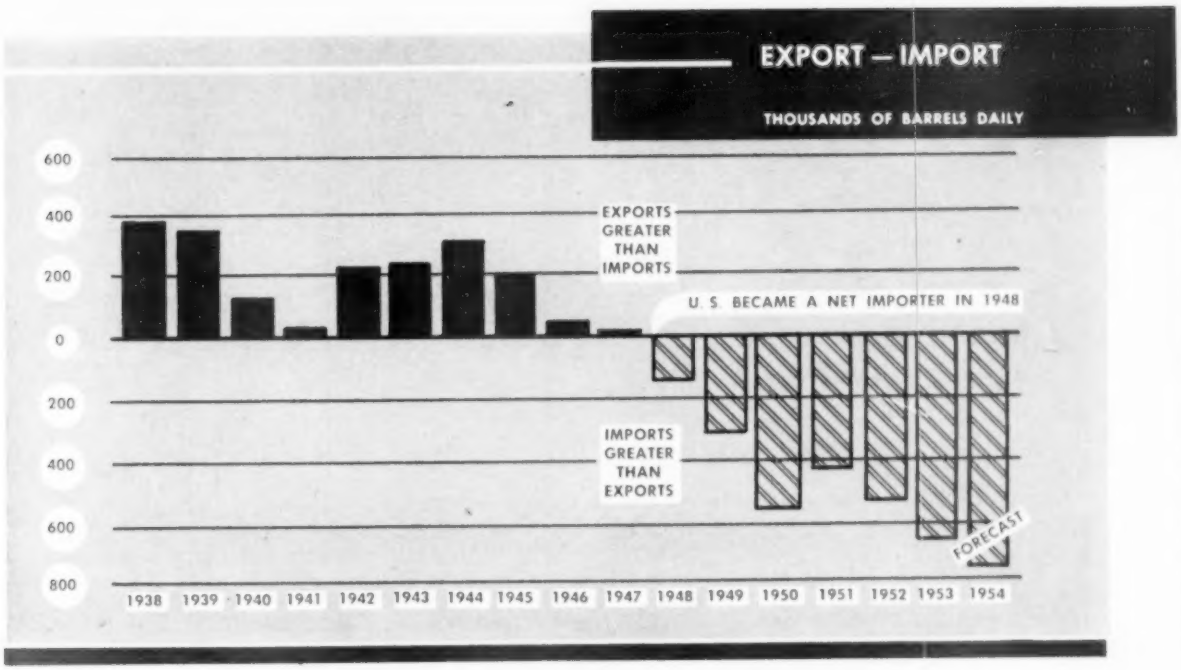
Imports of crude oil increased 79,000 bbl. per day—652,000 bbl. daily in 1953 compared with 573,000 bbl. daily in 1952. However, more than half of this increase was made up of imports to the West Coast, to meet a regional and temporary shortage, and therefore had no real impact on the economy of the oil industry east of the Rockies. Last year the West Coast imported 78,000 bbl. per day of foreign crude oil compared with 32,300 bbl. per day in 1952—an increase of 45,700 per day, or 141.5 per cent.

On the other hand, imports of crude to the rest of the United States did not go up spectacularly. The breakdown shows 574,000 bbl. per day of crude imported to areas other than the West Coast, compared with 540,400 bbl. per day in 1952—an increase of 36,600 bbl. per day, or 6.2 per cent.

However, this ratio is very apt to shift during 1954. California's production recently has come close to balancing West Coast demand, so imports to that area should be considerably less this year. This will mean that a much greater proportion of the forecast increase of 23,000 bbl. per day of crude will have an impact on domestic production in the Mid-Continent region.

Where this crude came from during the first 10 months is shown in one of the tables with this article. Venezuela is still by far the largest supplier, with almost exactly half of the total shipments, but our purchases from that nation dropped 7.4 per cent as against 1952 imports. This is largely because the Venezuelan Government and producing companies there cooperated to curtail production when domestic output in the United States was being reduced.

Kuwait and Saudi Arabia showed the big gains, both in volume and percentage. Each of those Middle East countries has been selling more than 100,000 bbl. per day in the United States. Qatar, that barren little "thumb" in the Persian Gulf, became an important factor in the American market last year by sending us 7,500 bbl. per day, and Iraq, which now has



big pipe-line outlets to the Mediterranean, more than doubled its shipments. Altogether, the Middle East countries supplied more than one-third of our crude imports last year.

The Far East crude all went to our West Coast, as did the single tanker load from Ecuador, due chiefly to a temporary supply stringency in California. Canada more than doubled its sales of crude to us, but still was less of a factor than Qatar. During the year, Canada completed two big pipe lines which, potentially, put her in position to send much larger volumes of crude across our border. For the time being, however, the chief effect of these lines is to reduce Canada's purchases of crude from the United States.

And that brings up the point of what is happening to our export trade in petroleum. It's shown at a glance in one of the charts with this article, and the details can be studied in one of the tables.

During the last 15 years our exports of crude have declined to a piddling amount as other parts of the world developed their own supplies. Except for relatively small quantities of certain specialty crudes, our only important market recently has been Canada, and that market is on the point of disappearing entirely. Now, thanks to its own reserves and its own pipe lines, Canada needs no more California crude on her West Coast, and very little Mid-Continent crude in its Sarnia refining area.

Products exports, as the table shows, have varied considerably from year to year but are still about as good as any year except the war years. However, they seem to be due for further declines as new refineries in Europe and elsewhere are preparing to produce lubes, aviation gasoline, and the other specialty products which make up the bulk of our products exports at present.

This drop in total exports combined with the increase in total imports has caused a tremendous swing in our balance of foreign trade in oil, as the chart dramatizes. There is every indication that this trend will continue.

IMPORT-EXPORT TRENDS
(Thousands of barrels daily)

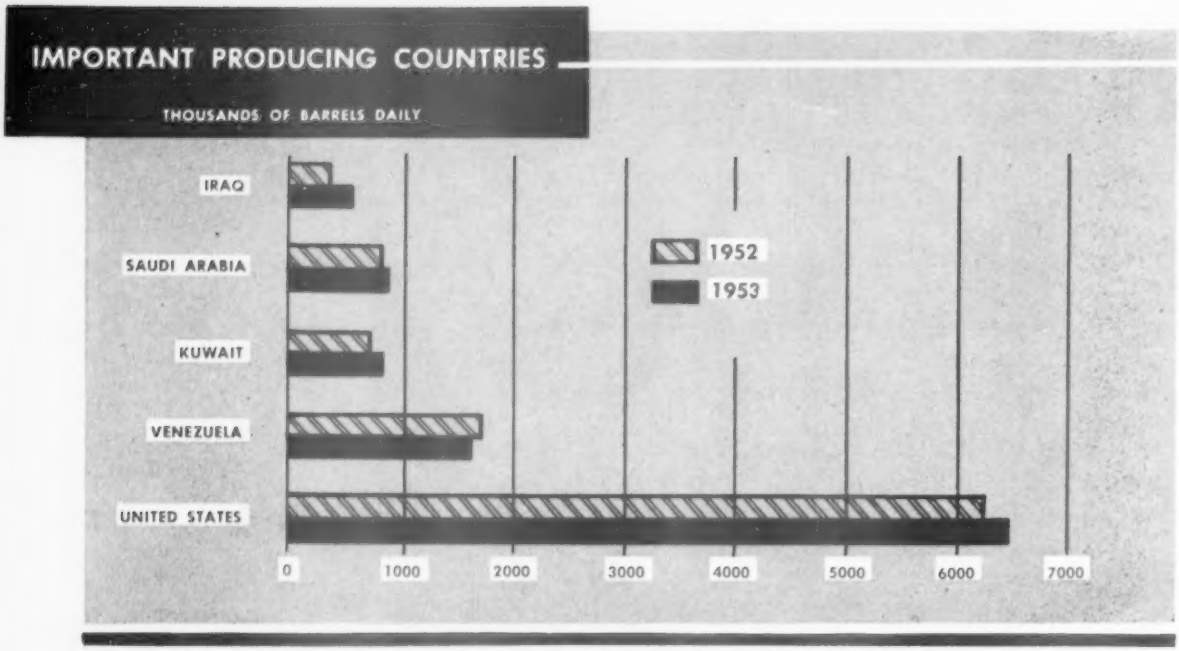
	Imports			Exports		
	Crude	Products	Total	Crude	Products	Total
1938	72	77	149	212	319	531
1939	91	71	162	198	320	518
1940	117	112	229	141	215	356
1941	139	127	266	91	207	298
1942	34	64	98	93	227	320
1943	38	136	174	113	298	411
1944	122	130	252	94	477	571
1945	203	108	311	90	411	501
1946	236	141	377	116	303	419
1947	267	170	437	127	324	451
1948	353	161	514	109	259	368
1949	421	224	645	91	236	327
1950	487	363	850	95	210	305
1951	490	354	844	78	344	422
1952	573	384	957	73	‡359	432
1953:						
1st ¼	620	486	1,106	71	355	426
2nd ¼	679	371	1,050	69	366	435
3rd ¼	664	304	968	40	321	361
4th ¼*	645	460	1,105	37	299	336
Year	652	405	1,057	54	335	389
1954†	675	401	1,076	49	272	321

*Estimated. †Forecast. ‡Revised.

CRUDE IMPORTS BY COUNTRY OF ORIGIN*
First 10 Months
(Thousands of barrels daily)

	1953	1952	Change Volume	Change Per cent
Mexico	12.8	22.6	— 9.8	— 43.4
Colombia	42.9	45.2	— 2.3	— 5.4
Venezuela	319.2	326.6	— 7.4	— 2.3
Ecuador	0.3		+ 0.3	
Canada	7.1	3.0	+ 4.1	+136.7
Kuwait	105.6	70.2	+35.4	+ 50.4
Saudi Arabia	103.2	75.5	+27.7	+ 36.7
Qatar	7.5	1.3	+ 6.2	+476.9
Iraq	4.5	1.8	+ 2.7	+150.0
Far East	39.2	12.5	+26.7	+213.6
Total	642.3	558.7	+83.6	+ 15.0

*Reported by the U. S. Department of Commerce.



RESERVES EXCEED FORECAST

World Production Gains 5.1 Per Cent in '53

by Dahl M. Duff

THE international petroleum industry is entering 1954 with a considerably higher underground inventory along with prospects for a continued slackening in demand increases over the next few years.

World-wide oil reserves were substantially up from estimates at the end of 1952. The most spectacular gains were again shown for the great fields of the Middle East, but sizable increases were made elsewhere in both hemispheres.

Total oil output of the Free World, averaging 11,797,300 bbl. daily in 1953, gained 5.1 per cent over the previous year. Non-Communist foreign production of 5,337,300 bbl. daily was up 7.6 per cent. Crude output of the United States rose 3.2 per cent to 6,460,000 bbl. daily.

The percentage increases in production both in the United States and abroad, though higher than those in 1952, were considerably less than the sharp rises that occurred in 1950 and 1951 under the impact of rearmament and the Korean War. Forecasts in the industry point to a further tapering off in the rate of increase in demand, and hence production, over the next several years.

In 1954, Free World demand is expected to show a gain of about 4.6 per cent, dropping to 3.7 per cent in 1955, and 2.9 per cent in 1956. Following the postwar pattern, foreign demand will rise at the somewhat higher rate of around 5.4 per cent in 1954, 5.1 per cent in 1955, and 3.9 per cent in 1956.

Even assuming stable conditions, these forecasts may be on the conservative side. Industry estimates have generally been under rather than over since the end of the war. And, of course, they could be completely upset by an unexpected development such as another rearmament boom or an industry upheaval like the loss of Iran.

If any conclusion can safely be drawn from the statistical position at the end of 1953, it is that there is no lack of enough oil to meet presently foreseeable requirements. At the end of the year, total non-Communist foreign reserves, mainly concentrated in the Middle East, represented a better than 50-year supply at current production rates.

The buildup of reserves and industry facilities to produce, transport, and refine this oil also is reflected in the current amount of shut-in production world-wide. This now aggregates some 2,800,000 bbl. daily. Of the total, an estimated 1,500,000 bbl. daily is in the United States, and another 700,000 bbl. daily in Iran. The remainder is distributed among the major producing countries of Kuwait, Saudi Arabia, Venezuela, and Canada.

Exploration Outside U. S. at Record Levels

Under such circumstances, the industry could normally expect a gradual and increasing slowdown in exploration activity. However, outside the United States, exploratory work continues at what appear to be record high levels. Although the program in the Middle East is sustained by a relatively small amount of drilling, elsewhere in the Eastern Hemisphere and in Latin America efforts to find additional oil are proceeding at an apparently undiminished pace.

Part of this may be due to the usual lag between demand trends and exploratory effort. In foreign areas, there are several other considerations of impor-

World Crude-Oil Production and Reserves

Country—	Production (thou. of bbl. daily) 1953 (partly est.)	1952	Per cent change	Est. crude reserves* (millions of bbl.)	Ratio, reserves to 1953 annual prod.
W. Hemisphere:					
Alaska				70.0	
Argentina	77.2	67.8	13.9	325.0	11.6
Bolivia	1.4	1.4		12.0	23.7
Brazil	2.7	2.0	35.0	50.0	49.1
Canada	220.0	167.2	31.6	1,950.0	24.3
Chile	3.4	2.4	41.7	55.0	44.3
Colombia	108.0	105.8	2.1	550.0	13.9
Cuba	0.1	0.1		2.0	90.8
Ecuador	8.1	7.7	5.2	28.0	9.6
Mexico	199.0	210.6	—5.4	1,725.0	23.8
Peru	43.5	44.8	—2.9	250.0	15.7
Trinidad	61.1	58.1	5.2	285.0	12.9
Venezuela	1,762.0	1,803.9	—2.3	9,900.0	15.4
Total	2,486.5	2,471.8	0.6	15,202.0	16.6
Europe & Africa:					
Algeria	1.7	0.8	112.5	5.0	8.1
France	7.1	6.6	7.6	32.0	12.3
Fr. Morocco	2.1	2.1		13.0	17.8
West Germany	41.7	34.0	22.7	300.0	19.7
Italy	1.9	1.4	35.8	6.0	8.7
Netherlands	15.6	13.6	14.7	100.0	17.8
Egypt	46.2	44.9	2.9	140.0	8.3
United Kingdom	1.1	1.1		3.5	8.7
Total	117.4	104.5	12.3	599.5	14.0
Middle East:					
Bahrain	30.1	30.1		280.0	24.8
Iran	28.0	27.7	1.1	15,000.0	1,465.0
Iraq	573.0	385.1	49.3	14,000.0	66.8
Kuwait	850.0	747.1	13.8	22,000.0	70.8
Neutral Zone				300.0	
Qatar	79.8	68.8	16.0	1,500.0	46.2
Saudi Arabia	842.0	824.8	2.1	28,000.0	91.0
Turkey	0.5	0.4	25.0	80.0	444.0
Total	2,403.4	2,084.0	15.3	81,160.0	92.5
Other Asia:					
British Borneo	101.0	104.5	—3.4	550.0	15.0
Burma	3.2	2.4	33.3	50.0	42.8
India	6.3	5.7	10.5	30.0	13.1
Indonesia & W. New Guinea	210.0	175.7	19.9	1,900.0	24.8
Japan	5.7	5.7		28.0	13.5
Pakistan	3.8	3.8		25.0	17.2
Total	330.0	297.8	10.8	2,583.0	21.4
Total, foreign less Russia and other Communist areas	5,337.3	4,958.1	7.6	99,544.5	51.1
United States	6,460.0	6,262.3	3.2	*30,028.0	12.7
Total Free World	11,797.3	11,220.4	5.1	129,572.5	30.1
Est. Russia and other Communist countries:					
Austria (Soviet Zone)	62.5	55.0	13.7	200.0	8.8
Romania	90.0	85.0	5.9	400.0	12.6
U.S.S.R.	1,040.0	935.0	11.2	9,000.0	23.7
Others	32.0	25.2	25.9	140.0	12.0
Total	1,224.5	1,100.2	11.3	9,740.0	21.8
World total	13,021.8	12,320.6	5.7	139,312.5	29.3

Reserve figures for Iraq and Kuwait have been revised from those given in the Journal's International Issue, December 21. Other Communist countries comprise Hungary, China, Czechoslovakia, Albania, Poland, and Yugoslavia. Little reliable up-to-date information is available on either production or reserves in most of these Communist countries.

***Reserves in United States include crude and lease condensate.**

tance. One is that the excess producibility and ample reserves are concentrated in a few large oil-exporting countries and that production developed in a consuming country holds an economic advantage. Furthermore, at the present time, the large companies active abroad are seeking to diversify and spread out their cushion of production. The various smaller American companies now working in foreign areas are in some cases motivated by a feeling that the more promising wildcatting prospects are available overseas. In addition, some companies consider that the best success comes from a relatively constant rate of oil-finding effort, disregarding what might be termed relatively short-term demand fluctuations.

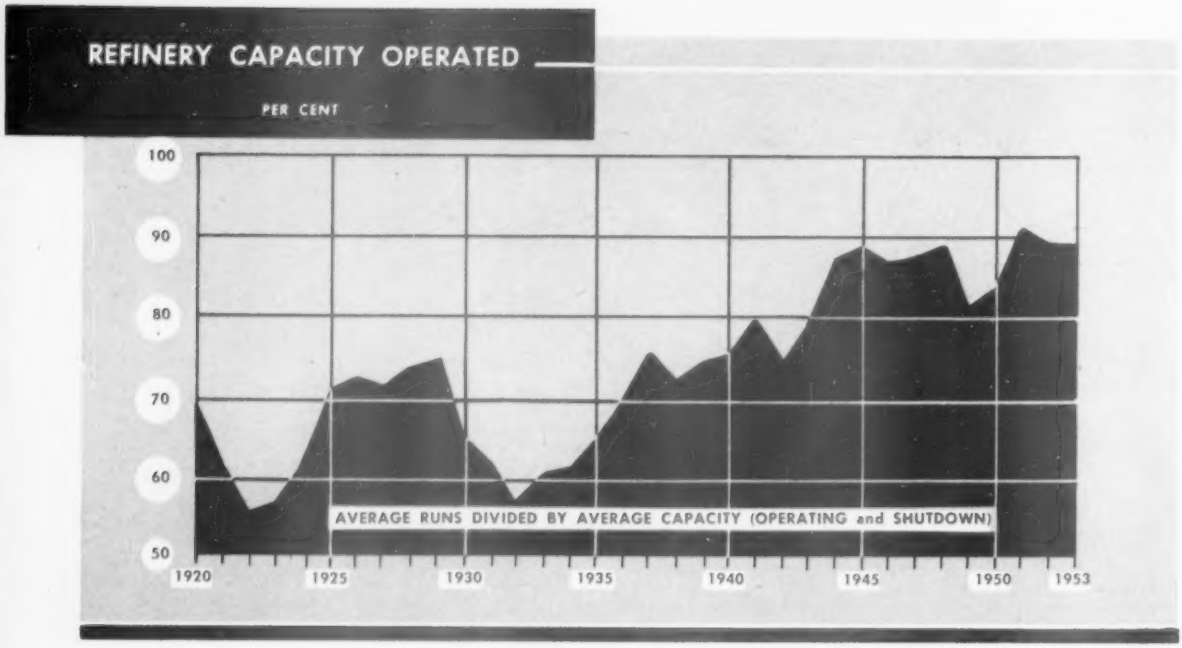
Aside from Canada, the largest production increases in 1953 among the important producing countries occurred in the Middle East. Output from this region as a whole was up 15.3 per cent. The previous year, Middle East production gained about 8.6 per cent, despite the fact that 1952 was the first full year in which there was no appreciable oil from Iran.

In 1953, Iraq showed the sharpest increase of any large oil country—49.3 per cent. This was the result of a full year of operation of the new 30 and 32-in. pipe line from Kirkuk field to Banias, Syria. Kuwait's output gained nearly 14 per cent, and the shaikhdom nosed Saudi Arabia out of the rank of the leading producing country in the Middle East. Kuwait, producing a sterling crude holding an advantage over dollar oil in soft-currency markets of the Eastern Hemisphere, in October hit an all-time high to that date of 950,300 bbl. daily.

Total reserves in the Middle East at the end of the year were estimated at more than 81,000,000,000 bbl., a 92.5-years supply on the basis of 1953 production. Largest reserves were credited to Saudi Arabia with an estimated 28,000,000,000 bbl. Other estimates of proved reserves in Saudi Arabia run even higher and at totals considerably above the entire proved reserves of the United States. A major part of this oil is in Greater Ghawar field comprising the former separate areas of Shedgum, Ain Dar, and Uthmaniyah.

Production in Venezuela, still the largest oil-exporting country, slumped in 1953. Output hit a low of 1,682,100 bbl. daily in August and was at a depressed level throughout the year to November. The final 2 months saw an upturn.

Canadian production showed another substantial increase in 1953, and further gains are anticipated. Crude from the prairie provinces has reached new year-round markets with the completion of pipe-line outlets to the Vancouver area and to Sarnia.



ANOTHER ALL-TIME RECORD

Refinery Runs Top 7,000,000 Bbl. Daily

REFINERS ran an average of 7,002,000 bbl. daily of crude in 1953 to set another all-time record. Operations were above 7,000,000 bbl. daily for 8 months of the year. Averages for the first and third quarters were also above 7,000,000 bbl.

Runs reached the lowest quarterly average in the last 3 months of the year. The lowest single month of the year was April with 6,780,800 bbl. daily. Peak runs for the year came in August when the average climbed to 7,162,800 bbl. daily. The entire third quarter averaged 7,097,000 bbl. daily.

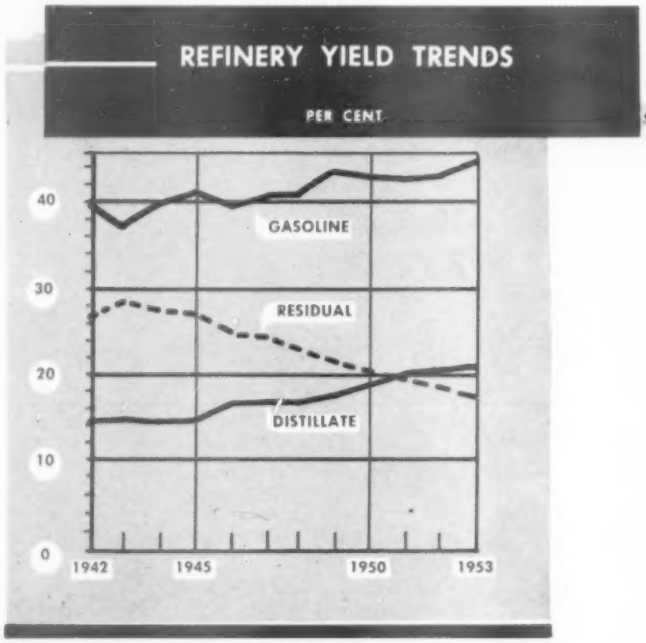
Quarterly distribution of runs during 1953 tended to raise total runs for the year more than was needed to meet product demands. The results was a surplus of product stocks at the end of the year.

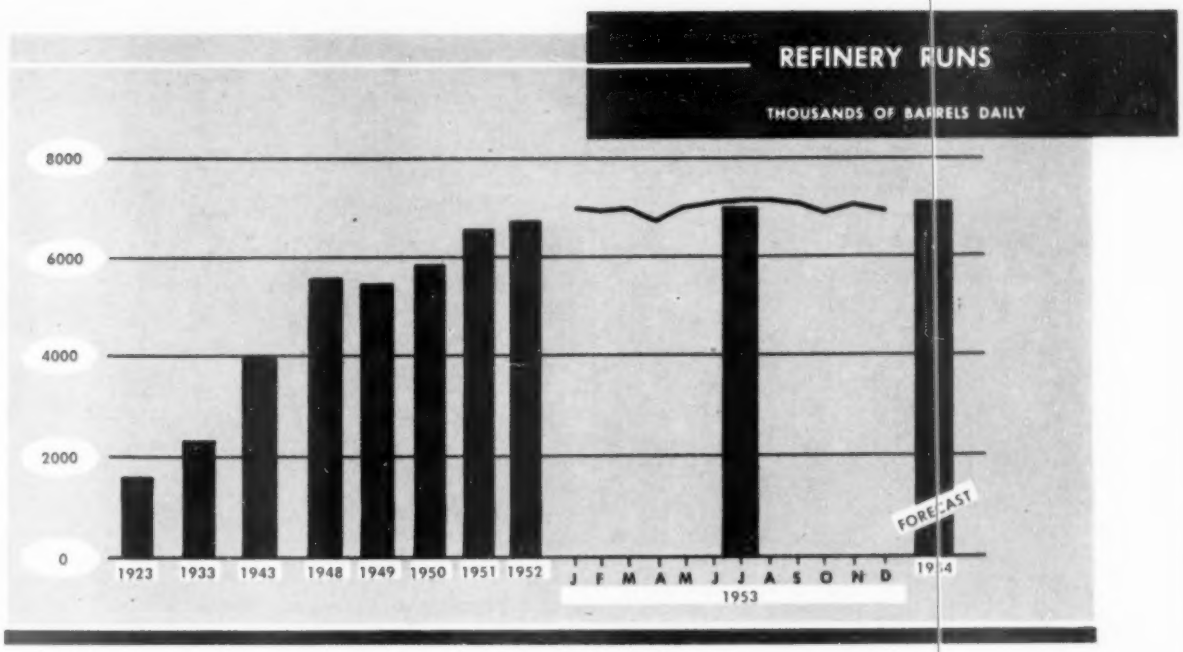
Warmer-than-normal weather in the first quarter of the year held distillate-demand increases well below gains in potential, based on number of consuming units. Distillate stocks at the end of the quarter were about 11,000,000 bbl. higher than the year before, and total refined stocks were up 29,000,000 bbl.

Each year, runs decrease sharply in April as re-

REFINERY YIELD TRENDS

	Runs (thou. bbl. daily)	Yields (per cent) Gasoline	Kerosine	Distillate	Residual
1935	2,646	44.2	5.8	10.4	26.9
1936	2,920	44.1	5.3	11.8	27.0
1937	3,242	43.9	5.5	12.4	26.4
1938	3,192	44.3	5.5	13.0	25.3
1939	3,191	45.0	5.5	13.1	24.7
1940	3,536	43.1	5.7	14.2	24.4
1941	3,861	44.2	5.2	13.4	24.3
1942	3,655	39.8	5.1	14.7	26.9
1943	3,917	37.1	5.0	14.8	29.2
1944	4,551	39.4	4.7	14.4	27.7
1945	4,711	40.9	4.7	14.5	27.3
1946	4,740	39.6	6.0	16.6	24.9
1947	5,075	40.2	6.0	16.8	24.2
1948	5,549	40.3	6.0	18.7	22.9
1949	5,326	43.7	5.2	17.4	21.7
1950	5,739	43.0	5.6	19.0	20.2
1951	6,494	42.4	5.7	20.0	19.7
1952	6,670	43.0	5.4	21.3	18.6
1953	7,002	44.9	5.1	20.8	17.5





finers shift operations to meet the seasonal changes in demand. However, runs in May and June of 1953 were back above 7,000,000 bbl. daily. At the end of June, refined-product inventories were 60,000,000 bbl. above the same date in 1952. However, part of this increase was due to reduced operations in the second quarter of 1952 during the refinery strike.

High runs were necessary in the third quarter of 1952 because of the drop in inventories during the refinery strike, but high runs in the third quarter of 1953 prevented the needed adjustment in product stocks. The quarter ended with stocks still about 39,000,000 bbl. higher than the year before.

Expected heating-oil demands failed to materialize in the fourth quarter, and refiners were forced to cut runs. Even with the cut, product stocks were almost as high at the end of December as they were at the end of September.

The abnormally warm weather in the winter months of 1953 that held the middle-distillate demand increase for the year to about 1.5 per cent also tended to encourage the use of gasoline. Total demand for gasoline in 1953 was 6.8 per cent greater than in 1952. To meet this demand refiners raised the yield of gasoline to 44.9 per cent of the average barrel of crude processed. The only other year for which a higher gasoline yield was reported was 1939 when the calculated average was 45.0 per cent. However, it is believed that this figure was distorted by the failure to credit some of the gasoline produced that year to natural-gasoline products used in blending.

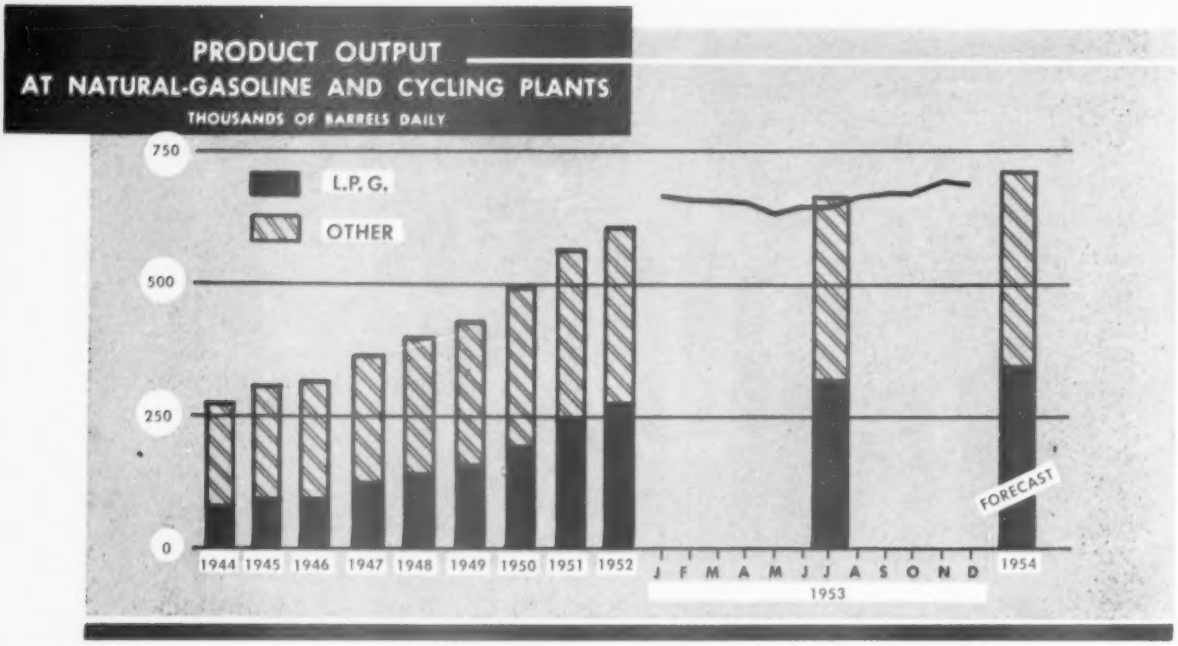
If the weather in the winter months of 1954 is near normal, the increased demand for distillate and the smaller gains in gasoline demand plus the extra gasoline in storage at the start of the year, all will tend to create a pressure for a shift in refinery yields during the year. The increase in total gasoline demand for 1954 is forecast at 3.6 per cent compared with the 6.8 per cent last year. Total distillate demand is expected to be up 11.9 per cent against 2.0 per cent in 1953. Gasoline stocks at the end of the year were about 23,000,000 bbl. more than at the end of 1952.

For the year 1953, the largest shift in gasoline yields was in the largest refining district. Refiners in the Texas Gulf Coast area turned 40.3 per cent of the average barrel of crude into gasoline in 1952 and increased the yield to 43.7 per cent in 1953. Gasoline yields in the Louisiana Gulf Coast district moved up from 44.0 per cent in 1952 to 46.9 per cent in 1953.

California refiners used more light imported crude in 1953 and raised gasoline yields to 37.1 per cent from an average of 35.5 per cent in 1952.

REFINERY RUNS BY DISTRICTS
(Thousands of barrels daily)

	1923	1933	1943	1948	1949	1950	1951	1952	1953	Per cent increase 1953 over 1952	Per cent increase 1953 over 1923
East Coast	320	457	532	867	768	908	1,015	1,029	1,044	1.5	226.3
Appalachian	58	92	150	157	155	165	179	183	198	8.2	241.4
Illinois, Indiana, etc.	140	321	727	908	915	1,039	1,201	1,227	1,278	4.2	812.9
Oklahoma, Kansas, etc.	193	265	340	452	425	486	520	544	589	8.3	205.2
Texas Inland	60	157	200	246	217	209	245	257	255	—0.8	325.0
Texas Gulf	223	440	918	1,392	1,283	1,312	1,567	1,599	1,702	6.4	663.2
Louisiana Gulf	87	107	157	435	432	470	502	522	551	5.6	533.3
N. Louisiana and Arkansas	25	51	74	81	75	71	79	79	85	7.6	240.0
Rocky Mountain	74	39	96	164	177	199	230	241	254	5.4	243.2
West Coast	412	431	723	847	879	880	956	989	1,046	5.8	153.9
Total	1,592	2,360	3,917	5,549	5,326	5,739	6,494	6,670	7,002	5.0	339.8



TREND STILL UPWARD

Natural-Gas-Liquids Gain Below 11-Year Average

by John C. Casper

PRODUCTION at natural-gasoline and cycling plants in 1953 continued the upward trend that has existed since records of complete production were started in 1941.

Total plant output averaged 662,400 bbl. daily in 1953 for a gain of 9.5 per cent over 1952. This percentage increase is larger than the gain in 1952 but is slightly under the average for the past 11 years. The average annual increase since 1942 has been 11.0 per cent. For comparison, the average annual increase in crude production for the same period has been about 5.0 per cent.

A large part of the gain in natural-gasoline and cycling-plant production can be credited to more efficient equipment for the extraction of L.P.G. Plant output of L.P.G. averaged about 314,400 bbl. daily in 1953 compared with 274,200 bbl. daily in 1952 and with 50,500 bbl. daily in 1942. L.P.G. production in 1953 was up 14.7 per cent compared with a gain of 13.1 per cent in 1952 and the 9.5 per cent increase in total plant production in 1953.

For the past 11 years the average increase in L.P.G. production has been 18.1 per cent, or greater than the relative gain for any other petroleum product.

Recent demand statistics indicate that an increasingly larger portion of the L.P.G. that is marketed for fuel and chemical uses is coming from natural-gasoline and cycling plants. In 1946, these plants supplied 69,900 bbl. daily or 62.3 per cent of total L.P.G. marketed in that year. This total does not include any of the L.P.G. produced at plants and shipped to refineries for blending with other gasoline components for marketing motor fuel. The plant portion of the total had climbed to 218,500 bbl. daily by 1952 and represented 72.1 per cent of all L.P.G. available for fuel and chemical uses that year. The ratio moved up to 73.4 per cent for 1953.

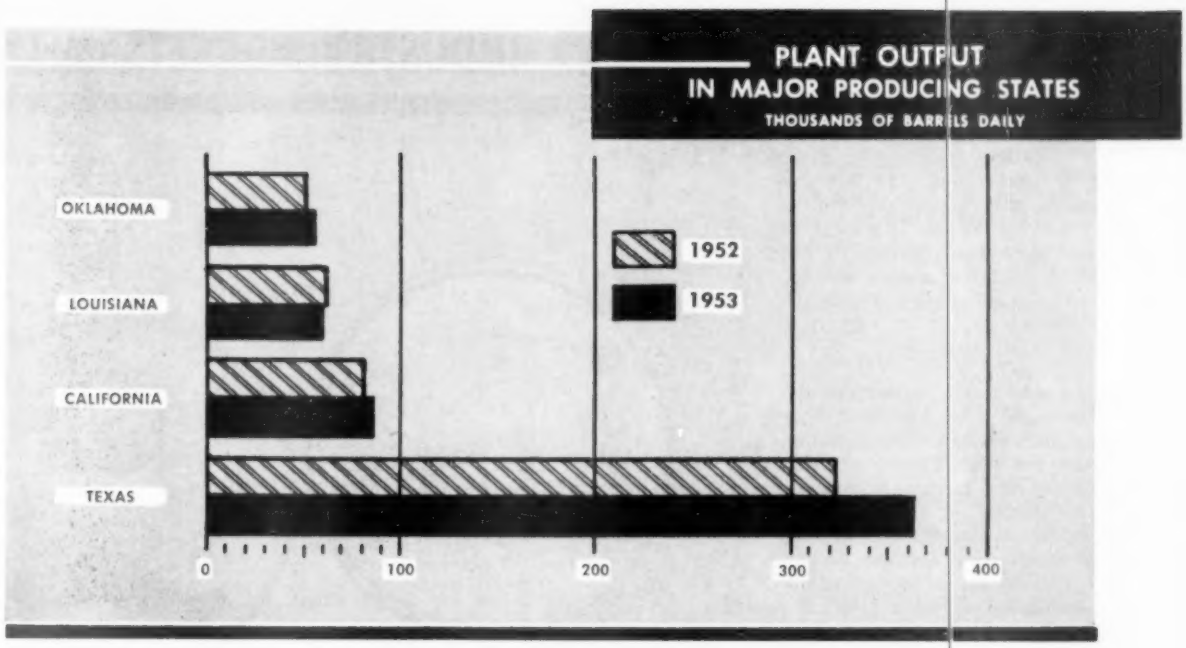
Production of natural gasoline averaged 252,900 bbl. daily in 1953 and is expected to move up to about 265,000 bbl. daily for 1954. The total for 1953 represented a gain of 6.0 per cent over 1952. The average annual gain since 1942 has been about 5.86 per cent or slightly less than the average increase of 6.66 per cent in total demand for motor fuel. The difference indicates a moderate decrease in the amount of natural gasoline blended in an average gallon of motor fuel.

Light-Products Stocks Increased Rapidly

Large additions to stocks of natural gasoline and L.P.G. indicate that the increase in demand for light products has not been as great as the gain in production. Total stocks of light products decreased in 1952 but increased rapidly in 1953.

Considering a decrease of about 1,000 bbl. per day in 1952, indicated demand for natural gasoline and related products from plants was 606,100 bbl. daily. On the other hand, the increase in inventories of 11,800 bbl. daily in 1953 leaves a total average consumption for the year of about 650,000 bbl. daily. Increase in demand for light products from plants was 7.3 per cent compared with the 9.5 per cent increase in production.

The large increase in L.P.G. stocks during 1953 was possible because of the increase in capacity of washed-out caverns in salt deposits. Demand for L.P.G. has been less than it would have been with normal weather in the first and fourth quarters of the year.



However, the warmer-than-normal weather in the first quarter did not leave too much of a stock problem at the end of the heating season. Stocks of L.P.G. at plants and terminals at the end of April were only 410,000 bbl. greater than a year earlier. The gain over the previous year had climbed to 832,000 bbl. by the end of July and to 2,280,000 bbl. at the end of October.

Since most of the underground storage for L.P.G. is located near producing areas, the lack of movement in the fall and early winter months may create a problem for suppliers by the end of the winter. A tank-car shortage would develop if very cold weather caused a big jump in demand during January and February. If the winter is much warmer than normal, stocks in underground storage in the Southwest will not be drawn down enough to leave space for the surplus that will be produced next summer from normal operations.

The major problem of the L.P.G. division of the industry has been and still is the lack of sufficient storage near points of consumption to cover variations in demand caused by abnormal conditions.

The general outlook for L.P.G. demand is good, but some marketers expect the annual increases of the future to be less than the average for the past 10 years.

An oversupply of natural gasoline developed during the late summer months and prices dropped in October at a time when the market should have been very strong.

PRODUCT OUTPUT AT NATURAL-GASOLINE AND CYCLING PLANTS—1953*
(Thousands of barrels daily)

	L.P.G.	Natural gasoline	Other	Total	Per cent increase
Appalachian	16.8	3.1	0.1	20.0	31.6
Ill., Ky., Mich.	20.0	4.2		24.2	21.0
Kansas	5.9	7.9		13.8	8.7
Oklahoma	26.5	27.4	1.1	55.0	5.2
Arkansas	3.5	3.5	0.3	7.3	2.8
Louisiana	18.5	13.7	29.1	61.3	—2.1
Gulf	7.0	10.2	10.1	27.3	5.4
Inland	11.5	3.5	19.0	34.0	—7.4
Mississippi	1.2	1.5	0.6	3.3	
New Mexico	8.6	11.5		20.1	11.0
Texas	183.6	122.4	57.3	363.3	12.3
Texas Gulf	30.8	20.0	25.3	76.1	3.1
West Texas	49.8	52.2	0.3	102.3	40.1
East Texas	17.7	14.9	0.2	32.8	0.6
Panhandle	48.1	7.6	0.8	56.5	10.8
Other Texas	37.2	27.7	30.7	95.6	2.8
Rocky Mountain	3.8	4.3	0.1	8.2	—3.5
California	26.0	53.4	6.5	85.9	4.9
Total	314.4	252.9	95.1	662.4	9.5

*Ten months actual, 2 months estimated.

TOTAL PLANT PRODUCTION BY YEARS
(Thousands of barrels daily)

	1948	1949	1950	1951	1952	*1953
Appalachian	11.1	11.3	13.6	17.5	15.2	20.0
Ill., Ky., Mich.	14.1	13.5	13.6	13.9	20.0	24.2
Kansas	7.0	7.3	10.1	11.5	12.7	13.8
Oklahoma	30.5	34.2	40.4	47.1	52.3	55.0
Arkansas	6.2	6.2	6.4	6.5	7.1	7.3
Louisiana	46.2	52.8	56.9	61.3	62.6	61.3
Mississippi	3.1	3.5	3.6	3.2	3.3	3.3
New Mexico	8.5	11.0	13.7	15.7	18.1	20.1
Texas	197.0	211.0	256.6	297.6	323.4	363.3
Rocky Mountain	4.6	5.2	6.0	7.7	8.5	8.2
California	72.6	74.4	77.6	81.0	81.9	85.9
Total	400.9	430.4	498.5	563.0	605.1	662.4

*Ten months actual, 2 months estimated.

PRODUCT OUTPUT BY YEARS
(Thousands of barrels daily)

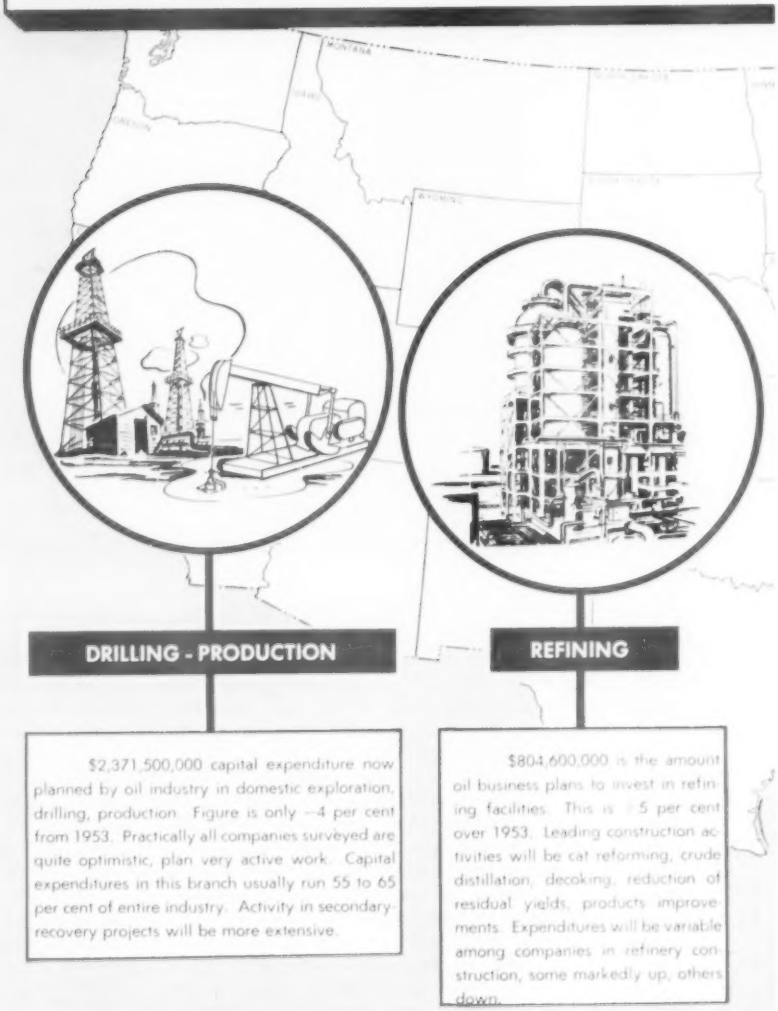
	L.P.G.	Natural gasoline	Other	Total	% increase Total	% increase L.P.G.
1942	50.5	135.1	42.7	228.3	3.0	9.5
1943	59.4	138.0	42.9	240.3	5.3	17.6
1944	76.1	142.4	54.8	273.3	13.7	28.1
1945	92.2	163.0	51.7	306.9	12.3	21.2
1946	91.9	175.5	49.7	317.1	3.3	—0.3
1947	123.4	179.0	59.7	362.1	14.2	34.3
1948	143.7	193.8	63.4	400.9	10.7	16.5
1949	158.5	196.3	75.6	430.4	7.4	10.3
1950	198.0	210.6	89.9	498.5	15.8	24.9
1951	242.4	235.0	85.6	563.0	12.9	22.4
1952	274.2	238.6	92.3	605.1	7.5	13.1
1953*	314.4	252.9	95.1	662.4	9.5	14.7
1954†	346.0	265.0	96.0	707.0	6.7	10.1

*Ten months actual, 2 months estimated. †Forecast.

WHAT'S AHEAD

THE JOURNAL PREVIEWS . . .

INDUSTRY BUDGETS for '54


DRILLING - PRODUCTION
REFINING
$2,371,500,000 capital expenditure now planned by oil industry in domestic exploration, drilling, production. Figure is only —4 per cent from 1953. Practically all companies surveyed are quite optimistic, plan very active work. Capital expenditures in this branch usually run 55 to 65 per cent of entire industry. Activity in secondary-recovery projects will be more extensive.
$804,600,000 is the amount oil business plans to invest in refining facilities. This is +5 per cent over 1953. Leading construction activities will be cat reforming, crude distillation, decoking, reduction of residual yields, products improvements. Expenditures will be variable among companies in refinery construction, some markedly up, others down.

Petroleum Earmarks Nearly

THE oil industry in 1954 now has plans to make capital expenditures totaling $3,733,800,000. This figure is calculated from data collected by The Oil and Gas Journal, after concluding last week a questionnaire which covered a majority of the oil industry as measured on capacity indexes.

Drilling-Production . . . The Journal's oil-industry poll, just completed, indicates presently planned 1954 capital expenditures in this branch will total $2,371,500,000.

Refining-Manufacturing . . . The Journal's oil-industry poll indicates presently planned 1954 capital expenditures in this branch will total $804,600,000.

Transportation . . . The Journal's oil-industry poll indicates presently planned 1954 capital expenditures in this branch will total $267,000,000.

Marketing-Other . . . The Journal's oil-industry poll indicates presently planned 1954 capital expenditures in this branch will total $290,700,000.

Replies to the Journal's telegraphic and airmail questionnaires indicate that 1954 will be a good oil year. The expenditures that are now budgeted by the petroleum business are substantial in all categories — drilling-production, refining, pipe lines-transportation, and marketing.

A number of the oil companies reported to the Journal that their budgets are slightly higher than for 1953. Other companies have about the same budget plans as for 1953, some have slightly smaller totals. Expressions from oil-company presidents and comptrollers added up to the viewpoint that no one seems to think there will be a total marked increase in 1954 capital expenditures, and likewise no one looks for an over-all marked decrease. The total of $3,733,800,000 would represent a decline of 6.6 per cent from 1953's indicated total capital spending in oil accounts.

In budget expenditures planned for 1954, company-by-company trends often vary considerably as regards drilling-production, refining-manufacturing, transportation, and marketing-other. This is a to-be-expected occurrence, however, as from year to year certain companies one year stress a large refining-modernization program, next year change to augmentation of crude-oil reserves, and similarly as to additional pipe-line projects and marketing.

Besides the mixed picture, company by company as to individual division, there is perhaps a greater-than-usual diversity of viewpoints among oil economists this year.

OIL INDUSTRY'S CAPITAL EXPENDITURES

INDUSTRY DIV.—	1954*	1953†	1952-1946‡
Drilling-Producing	$2,371,500,000	$2,460,000,000	12,275,000,000
Refining	804,600,000	760,000,000	2,740,000,000
Transportation	267,000,000	390,000,000	2,000,000,000
Marketing and Other	290,700,000	390,000,000	2,235,000,000
TOTAL U. S. OIL INDUSTRY	$3,733,800,000	$4,000,000,000	19,250,000,000

*Estimated by The Oil and Gas Journal. †Preliminary. ‡Inclusive; Chase National Bank.

DRILLING REFINING PIPE LINE
TRANSPORTATION
$267,000,000 is earmarked for crude-oil and products pipe lines and transportation facilities. Figure represents −32 per cent from 1953. New construction projects, additional pump stations and terminal facilities, automatic controls, more complete communications, all will be active. Storage installations and gaging-metering will be extended.
MARKETING - OTHER
$290,700,000 is presently budgeted for capital investments in marketing and allied activities, as polled for majority of the industry by The Oil and Gas Journal. This figure is −26 per cent from 1953. Competitive conditions will prevail to intense degree in this division; however, increase in domestic products consumption is expected to increase 5 per cent this year.

3¾ Billion for Expansion

One important factor tending to keep 1954 expenditures at a high level is the fact that there is always a considerable lag between the industry's outlay and conditions that produced it. The coming year will be carried forward on considerable momentum from the records of 1953. As a matter of fact, there are many projects which were planned or initiated in the heavy expansion period 1951-52-53 that are still under way. These call for continued heavy expenditures on the part of many companies.

The capital expenditures that are being budgeted now are more subject to change than in past 2 or 3 years. These budgets can work in both directions, and if company income starts dropping off during the year, then expenditures will also go down since they are in part financed from current revenue.

In the oil business itself, on the "bear" side, markets are not altogether in good shape, and stocks are high. On the "bull" side, there will be continuation of increase in demand. The usual tendency in the oil industry probably is to err on the conservative side. This has happened as a general rule since the end of the war.

One company prominent in the chemical, petrochemical, and oil and gas business put their review-forecast sentiments in this fashion: "Our management expects 1953 and 1954 to be 'a new normal,' a period which in future years will be looked back upon as an economic base period.

Normal . . . "By 'normal' our management means an extended period during which

- The economy is vigorous.
- Production is at high levels.
- Products are in plentiful supply.
- Competition is stiff.
- A generally even keel is maintained, in spite of some ups and downs.

New . . . "By 'new' the management means the sharp contrasts between the present economy and that of the mid-'20's and late '30's, which are still often used as economic base periods. Some of these contrasts are

- Enormously higher levels of productive capacity, wages, and standards of living.
- Greater international awareness.
- Greatly increased 'frozen-in' industrial overhead, including larger plant investments per employe and the added cost of new staff functions and employe fringe benefits.
- Increased social consciousness."

The president of an aggressive company in oil producing, refining and petrochemical operations in the southwestern states, last week gave this statement to The Oil and Gas Journal:

"I look to 1954 with great anticipation, for our company has new facilities, largely built in 1953 (our year of greatest expansion), which will be in production for most of 1954.

"We expect to drill more wells in search of oil and gas, if crude-oil prices can hold. The industry must keep present crude prices as a minimum to justify continued search for deep production and constantly mounting lifting costs.

"The year 1954 has a good chance to be a bang-up good year for oils and chemicals if we want it that way badly enough to put out the extra effort. The absence of hot war, along with tax reductions, should provide the necessary incentive.

"In contrast with many other segments of industry, consumption of oil and petrochemicals is expected to be up again in 1954. Much more selling effort will be needed to bring about this result, but our manufacturing, sales, and advertising departments are energetically preparing for the battle. Sales volumes in gallons and dollars will be higher, but profit unit margins will likely be lower."

WHAT'S AHEAD

Wildcat drilling will be up in every producing state in the Rocky Mountain area. Development drilling will be less than in 1953 unless important areas are opened by exploratory drilling. Total completions will be slightly under 1953 but up 34 per cent from 1952.
Western Canada
Total 1954 drilling in Western Canada is forecast at 2,440 wells including 850 wildcats and 1,590 development wells. The total represents an increase of 10 per cent over 1953. Wildcat drilling is expected to be up about 19 per cent.
Dist. V
Dist. IV
Programed drilling on the West Coast is about midway between completions in 1952 and the total for 1953. Expenditures for drilling may be near the total spent in 1953 with the small reduction in completions offset by increased costs for deeper drilling.
About 46 per cent of all wells and about 57 per cent of wildcats drilled in the United States in 1954 will be in District 3. The total of 22,242 wells will include 6,362 wildcats and 15,880 field wells. Largest relative gain will be in Louisiana, up 7.6 per cent in total drilling. Texas completions for the year are forecast at 16,859 wells.
Dist.

Second-Biggest Drilling Year

OPERATORS are expecting to drill 48,410 wells in the United States and 2,440 in Western Canada in 1954. If this program is fulfilled, it will make this year the second best drilling year in the history of the oil industry. Also, if completions over the past 14 years are plotted, the drilling scheduled for this year is about on the trend line.

Drilling in 1954 should not be compared directly with completions in 1953 which was an abnormal year. Actually, total drilling in 1953 included some completions that normally would have been in 1952 as well as some that would have been scheduled in 1954.

In the first half of 1952, pipe was a little more readily available, and operators had planned a well-rounded year of drilling. The steel strike in the summer of that year caused a return of the material shortage, and completions in the last half of the year dropped well below normal. As a rule, completions in the last 6 months of a year are above the first half of the year by about 8 to 10 per cent. The total of wells completed in the last half of 1952 was about 2.4 per cent less than the total for the first half.

It is estimated that at least 1,000 of the wells drilled in 1953 would have been completed in 1952 if material had been available. Also, the near certainty that the excess profits tax would be permitted to lapse at the end of 1953 influenced the shifting of some of 1954's normal drilling expenditures to the last half of 1953.

The fact that very large drilling programs were required after World War II to make up for loses during the war years influenced drilling and production expenditures at least through 1953.

In Line With General Trend

Total drilling from 1940 through 1952 represented an average annual increase of 3.3 per cent a year. The same increase for 1953 would have raised the total to about 47,400 wells, and a continuation of the same percentage gain would have resulted in 48,900 wells for 1954.

These data indicate that the drilling program for 1954 is about in line with the general trend since 1940. However, drilling has increased less than crude production, when comparison is made with averages for the 1935-1939 period.

Even with extra drilling shifted from both 1952 and 1954, the total for 1953 was only 82 per cent larger than the average number of wells drilled per year in the 1935-1939 period. On the other hand, crude production in 1953 represented an increase of 101 per cent over the annual average for 1935-1939. If natural-gas liquids and natural gas were considered in the production totals the percentag increase would be much higher.

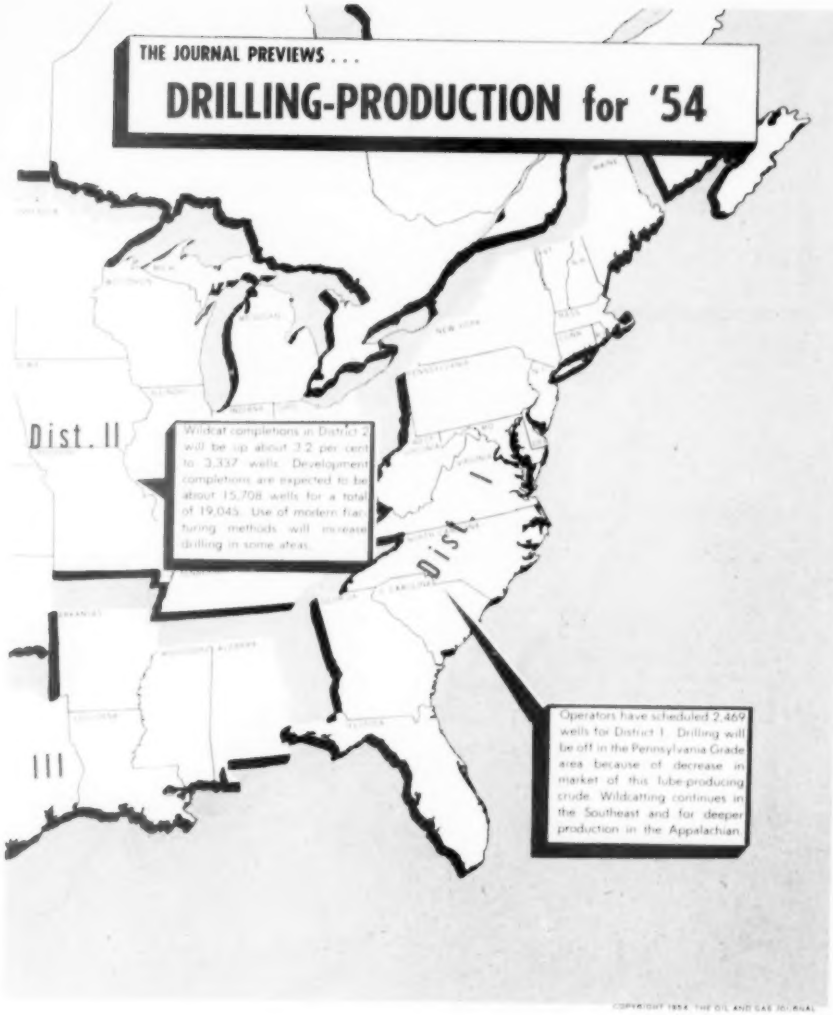
Since production from the discovered reserve of gas and liquids has been increasing faster than the rate of drilling for additional reserves, operators will either have to find more oil and gas per well or drill more wells.

For any given period of years, oil operators must find enough oil to replace production during the period and also add to the reserves enough oil to support the increases in production rates.

Current increases in demand for crude cannot be met from current increases in exploratory and development drilling. Most of the crude produced in 1954 will be from wells drilled years ago, and wells must be drilled in 1954 to supply the crude for the years ahead. This long time lag in production explains why operators who expect to continue in business cannot afford to let prices in crude and product markets be the major factors in determining the amounts to be spent on a drilling program in a given year.

District 3 will get the lion's share of the drilling in 1954. Total completions in the district during 1954 will amount to almost 22,250 wells. Every state in District 3 has crude production, the only PAD district for which this is the case.

Some of District 3 completions in


THE JOURNAL PREVIEWS . . .
DRILLING-PRODUCTION for '54
Dist. II
Wildcat completions in District 2 will be up about 3.2 per cent to 3,337 wells. Development completions are expected to be about 15,708 wells for a total of 19,045. Use of modern fracturing methods will increase drilling in some areas.
Dist. I
Operators have scheduled 2,469 wells for District 1. Drilling will be off in the Pennsylvania Grade area because of decrease in market of this lube-producing crude. Wildcatting continues in the Southeast and for deeper production in the Appalachian.
III

in History Now Programed

1954 will come from increases in offshore drilling, but since most of this drilling represents large-scale operations, the increase in number of wells completed under revived offshore drilling programs will be of less importance than the increase in expenditures.

The largest increase in drilling for a single state in 1954 will be in Louisiana. Reports from operators indicate that total completions for the state will be up about 216 wells, including gains of 73 wildcats and 143 development wells.

Texas completions for 1954 will be the second highest in history. The total is expected to be 16,859 compared with 17,003 in 1953 and 16,845 in 1952. Gains in total drilling are forecast for East Texas areas and for the Panhandle.

Texas drilling over the past few years has been influenced abnormally by the activity in West Texas. Footage drilled in this district, which includes Railroad Commission Districts 7-C and 8, jumped from 16,400,000 ft. in 1949 to 26,500,000 ft. in 1950. Further increases were reported for 1951, and the 1952 total reached almost 29,400,000 ft.

Canyon Reef Developments

Development of the Canyon reef fields in 1950 and 1951, followed by the rush of drilling in the Spraberry during much of 1952, lasted long enough for some operators to decide that drilling for these 3 years represented the normal rate. However, the drop in Spraberry development in 1953 cut the total footage to 20,300,000 ft. Drilling for 1954 should be compared with the long-term trend for the district and not with the years 1950-1952.

Reported company plans indicate increases for wildcat drilling in the Oklahoma-Kansas part of District 2 with some decreases in development drilling. However, the decrease in development drilling does not extend to secondary-recovery work.

Reductions in total drilling in the Illinois basin area are shown in company plans for 1954. The ever increasing demand for natural gas in the northeastern states influences the search for gas in the Appalachian areas. Experimental work in the use of modern fracturing methods in areas of eastern Ohio may promote drilling for that part of the district.

Further decreases are forecast for drilling in the Pennsylvania Grade crude areas. The drop in export demand for lubricating oils and the slowing down of the increases in this country resulted in decreases in demand for Pennsylvania Grade crude. Operators' estimates of the cut in secondary-recovery drilling in the area vary from 10 to 20 per cent.

Williston Basin Activity

Exploratory work will continue at a rapid pace in the Williston basin. Increases in wildcat drilling are indicated for Montana as well as North and South Dakota. The volume of development drilling will be determined by the success of these exploratory wells. Discovery of a good field with production from a moderate depth would push development completions above the total indicated in the forecast.

Reports from operators in California indicate a small decrease in the number of wells to be completed in 1953. However, the trend toward deeper exploratory drilling may account for the smaller number of total completions.

With the completion of the Trans Mountain line from Alberta to the west coast of Canada, the potential demand for California oil was cut by the amounts that had been exported to British Columbia. Also, refineries now planned or under construction in Washington will probably use some Canadian crude.

Drilling in western Canada will continue at an increased pace this year. The program calls for 136 more wildcats than last year and a gain of 89 wells in development completions. As in the Williston basin, any outstanding discovery could push the total development wells above the 1,590 forecast.

The 1954 drilling program for the western provinces will add to the reserve producing capacity and this in turn will add to the pressure for greater exports to the United States.

WHAT'S AHEAD

New Plants, Enlargements, Boost

CRUDE-CHARGING capacity of United States refineries is expected to rise to some 8.6 or 8.7 million barrels per stream day by the end of 1954. This represents an increase of approximately 8 per cent over the last quarter of 1953.

The increase will come from two sources, construction of new refineries and increase in crude-charging capacity in existing refineries. As shown in Table 1, nearly 160,000 bbl. per day of additional capacity is expected to be in operation due to the completion of new refineries at the end of the year or early in 1955. Added to this will be some 450,000 of aditional capacity due to expansion programs being carried out in existing refineries.

Plans are being laid for the construction of eight more domestic refineries, to be completed after 1954. These plants are listed in Table 2.

Catalytic reforming . . . The coming year will be a big one for catalytic reforming. Capacity in United States refineries will probably increase threefold within the next 12 months. The record construction program now under way reflects an industry-wide acceptance of this process for upgrading straightrun naphthas to high-octane gasoline blending stocks.

A survey at the end of 1953 shows that a total of 43 cat reforming units with a daily charge capacity of nearly 200,000 bbl. were in operation. *(See The Oil and Gas Journal, December 28, 1953, page 46, "Cat Reforming Boom is On," by George Weber, refining editor.)* On contract are 56 more units whose total rated capacity is 460,000 bbl. per day. With few exceptions, these units will be placed on stream some time during this year.

It is difficult to project actual cat reforming capacity a year in advance for two reasons. Completion schedules on some of the larger units cannot be fixed exactly at this time. Additional smaller units, which are being contracted continuously, can be installed in less than a year. Hence, the tentative projected capacity for December 31, may be placed at about 600,000 bbl. per stream day.

Table 3 clearly shows the trend toward larger units. The early postwar adoption of cat reforming was characterized by the building of many small units by independent refiners. As a result the average size of operating units built since the war is about 3,400 bbl. per day. By contrast, the average capacity of all cat reforming units now contracted but not yet in operation, is 8,500 bbl. per day.

This reflects the entry of the major oil companies into the catalytic reforming field. Having relied mainly on high catalytic cracking and thermal reform-

CANADA — Six Canadian refineries are entering new construction or plant-expansion programs. A new refinery has been authorized for Canadian Petrofina, Ltd., at Montreal.
PACIFIC NORTHWEST — Shell Oil Co. has contracted for a new 50,000-bbl. refinery at Anacortes, Wash., and General Petroleum Corp. is building a new 35,000-bbl. refinery at Ferndale, Wash.
WILLISTON BASIN — There are four refining projects definitely contracted and building in this area: (1) Standard (Ind.) at Mandan, N. D., 30,000 bbl. per day; (2) Great Northern Oil Co. at Minneapolis, 25,000 bbl. per day; (3) Williston Basin Refining (Williston, N. D.); and (4) Queen City Oil and Refining (Dickinson, N. D.), both totaling 3,000 bbl. per day.
ROCKY MOUNTAIN — Among several plant expansions taking place in this area are projects at the Sunburst, Mont., plant of The Texas Co., and at the Billings, Mont., plant of Carter Oil Co. Carter is planning a 3,000-bbl. coker.
LOS ANGELES — Some 50,000 bbl. per day of catalytic reforming capacity is being added in this area at six refineries. Union Oil Co. is planning construction of a coking unit and a lube-blending plant. Standard (Calif.) is building a 52,000-bbl. resid. stripper and a 40,000-bbl. cat cracker.

TABLE 1—NEW U. S. REFINERIES UNDER CONSTRUCTION

Company—location	Capacity barrel per day	Completion date (estimated)
General Petroleum Corp., Ferndale, Wash.	35,000	1954
Pacific Oil & Ref. Co., Seattle	12,000	1954
Pan American Ref. Corp., Goodwin Neck, Va.	25,000	1954
Queen City Oil & Ref. Co., Dickinson, N. D.	2,000	1954
Shell Oil Co., Anacortes, Wash.	50,000	1955
Standard Oil Co. (Ind.), Mandan, N. D.	33,000	1954
Williston Basin Ref. Co., Williston, N. D.	1,500	1954

TABLE 2—PLANNED NEW CONSTRUCTION, U. S. REFINERIES

Company and location—	Capacity bbl. per day
American Bitumils & Asphalt Co., Miami Ford, Ohio	
Dakota Oil & Ref. Co., Minot, N. D.	
Gilmore Refineries, Inc., Odessa, Tex.	50,000
Great Northern Oil Co., Minneapolis-St. Paul	25,000
Pan American Ref. Corp., Pedricktown, N. J.	25,000
Paragon Oil Co., Newark, N. J.	20,000
Proven Oil & Refining Co., Florence, Ariz.	16,500
Trans-Marine Oil Ref. Corp., Milwaukee	

THE JOURNAL PREVIEWS . . .
REFINING Expansion in '54
CHICAGO — Several construction projects are under way in this area. Among the more important are construction of a 20,000-bbl. gasoline fractionator at Sinclair's East Chicago plant, the construction of a 30,000-bbl. cat reformer at Standard's (Ind.) Whiting refinery, and construction of a 12,500-bbl. cat reformer at Cities Service, East Chicago.
NEW YORK - PHILADELPHIA — Nearly 60,000 bbl. per day of catalytic reforming capacity is being added in this area at five refineries. Pan American is planning a new 25,000-bbl. refinery for the area. Two new crude units, totaling 134,000 bbl. per day, are being constructed.
ST. LOUIS — Shell (Wood River, Ill.) is building new crude unit, and is expanding from 130,000 to 170,000 bbl. per day crude charge. Shell is building a 16,000-bbl. cat reformer. Standard (Ind.) is building a 9,000-bbl. cat reformer at Wood River.
CLEVELAND - TOLEDO — American Bitumils & Asphalt Co. is planning a new refinery at Miami Ford, Ohio. Ohio Standard and Bay Refining Corp. are planning new cat cracking units. Seven refineries are planning to install a total of 55,000 bbl. per day of cat reforming capacity.
GULF COAST — The major refinery-construction projects on the Gulf Coast for the coming year have to do with the installation of new catalytic reforming capacity. Total capacity of approximately 120,000 bbl. per day is being installed in 10 refineries.

Refining Capacity 8 Per Cent

ing capacity, many large companies are now engaged in building a number of major cat reforming units. Examples are Indiana Standard and subsidiaries adding 68,800 bbl. per day, Gulf Oil Corp. building 55,000 bbl., Socony-Vacuum and affiliates, 42,000 bbl., Shell Oil Co. adding 44,000 bbl. and The Texas Co., 40,070 bbl.

When this new capacity comes on stream, the octane potential of domestic motor fuel will rise to a marked extent. Not all reformers are engaged or will engage in the upgrading of naphtha stocks for octane exclusively. Of the total number of currently operating units, about 127,600 bbl. per day in charge capacity are used wholly or in part for the production of benzene, toluene, xylenes, and other basic aromatics for aviation-gasoline blending and chemical manufacture. An additional 10,500 bbl. per day in units under construction are designed for this use.

Octane potential up . . . Assuming no increased trend toward aromatics, it appears that the domestic refining industry will have at hand by the end of next year, approximately 500,000 bbl. per day in cat reforming capacity for the upgrading of straightrun naphthas.

This, superimposed on a maximum of over 400,000 bbl. per day in thermal reforming capacity will go a long way toward realizing higher octanes from the virgin naphthas available for processing in United States refineries.

TABLE 3—CATALYTIC REFORMING UNITS CONTRACTED OR UNDER CONSTRUCTION

PLATFORMING

Company and location—	Charge capacity, B.P.S.D.
Aurora Gasoline Co., Detroit	7,500
Aurora Gasoline Co., Elsie, Mich.	1,500
Bell Oil & Gas Co., Grandfield, Okla.	2,200
California Oil Co., Perth Amboy	10,700
Coltex Refining Co., Colorado City, Tex.	1,500
Continental Oil Co., Ponca City	8,000
Famariss Oil & Refg. Co., Monument, N. M.	750
Great Southern Chemical Corp., Corpus Christi	4,000
Gulf Oil Corp., Philadelphia	16,000
Gulf Oil Corp., Port Arthur	29,000
Gulf Oil Corp., Toledo	10,000
McMurry Refining Co., Tyler, Tex.	5,000
Onyx Refining Co., Hawley, Tex.	650
Pana Refinery Co., Pana, Ill.	650
Phillips Petroleum Co., Sweeny, Tex.	16,000
Phillips Petroleum Co., Borger, Tex.	7,000
Pontiac Refining Corp., Corpus Christi	5,000
Quaker State Oil Ref. Corp., Oil City, Pa.	1,500
Republic Oil Ref. Co., Texas City	5,500
R J Oil & Ref. Co., Inc., Princeton, Ind.	600
Rock Island Ref. Corp., Rock Island, Ind.	1,800
Shell Oil Co., Anacortes, Wash.	8,000
Shell Oil Co., Martinez, Calif.	5,000
Shell Oil Co., Wood River, Ill.	16,000
Standard Oil Co. (Ohio), Lima, Ohio	12,000
Sun Oil Co., Toledo	15,000
Sunray Oil Corp., Duncan, Okla.	5,000
Tidewater Associated Oil Co., Avon, Calif.	10,000
The Texas Co., Amarillo, Tex.	4,800
The Texas Co., Westville, N. J.	11,970
The Texas Co., El Paso	3,300
The Texas Co., Port Arthur	20,000
Union Oil Co. of Calif., Wilmington	14,500

FLUID HYDROFORMING

Cities Service Ref. Corp., Lake Charles, La.	15,000
Cities Service Oil Co., East Chicago	11,500
Standard Oil Co. (Ind.), Whiting	30,000

THERMOFORM CATREFORMING

General Petroleum Corp., Billingham, Wash.	5,000
General Petroleum Corp., Torrance, Calif.	14,500
Magnolia Petroleum Co., Beaumont	17,000
Socony-Vacuum Oil Co., Inc., Augusta, Kan.	3,000

CATFORMING

Atlantic Refining Co., Philadelphia	12,000
Atlantic Refining Co., Port Arthur	8,000
Douglas Oil Co. of Calif., Bakersfield	2,500
Mid-Continent Pet. Corp., Tulsa	7,500
Mohawk Petroleum Corp., Bakersfield	2,500
Port Fuel Co., Brownsville, Tex.	1,000
Union Oil Co. of Calif., Cut Bank, Mont.	600

ULTRAFORMING

Pan American Ref. Corp., Texas City	21,000
Pan-Am Southern Corp., El Dorado, Ark.	7,200
Standard Oil Co. (Ind.), Sugar Creek, Mo.	9,000

HOUDRIFORMING

Ohio Oil Co., Robinson, Ill.	8,000
Petrocarbon Chemicals, Inc., Irving, Tex.	1,000

SINCLAIR REFORMING

Pure Oil Co., Newark, Ohio	3,000
Sinclair Ref. Co., Marcus Hook, Pa.	16,000

THE JOURNAL PREVIEWS . . .
NATURAL-GASOLINE Outlook for '54
Shell Oil Co. of Canada is building increased capacity amounting to 45,000 M.c.f.d. at Calgary.
Signal Oil & Gas Co. is building a gasoline plant at Tioga, N. D., with capacity of 65,000 M.c.f.d.
At Elk City, Okla., Shell Oil Co., operator, the cycling plant is being increased to a gas-processing capacity of 225,000 M.c.f.d. Signal Oil & Gas Co. has authorized construction of a plant in Carter County, Oklahoma, with capacity of 40,000 M.c.f.d.
Natural-gasoline plant construction in New Mexico includes: Warren Petroleum Corp. at Lovington with capacity of 22,000 M.c.f.d.; Atlantic Refining Co. in Lea County with capacity of 25,000 and Skelly Oil Co. at Eunice with capacity increase of 20,000.
Gulf Oil Corp is building a cycling plant in St. Landry Parish, Louisiana, with capacity of 210,000 M.c.f.d. Continental Oil Co. at Lake Charles, La., is constructing a natural-gasoline plant with capacity of 63,000 M.c.f.d.
Natural-gas processing-plant projects under construction in Texas include: El Paso Natural Gas Co. in Upton County, capacity of 167,000 M.c.f.d.; Shell Oil Co. at Sheridan, and Lone Star Producing Co. in Runnels County, 30,000 M.c.f.d.

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Gas-Handling Capacity Due for Sharp Rise

MOST important construction of natural-gasoline and cycling plants in progress during 1954 is summarized in the map. These major projects add up to increases in gas-handling capacity of 477,000 M.c.f.d. in natural gasoline, including capacity increase of Shell Oil Co. of Canada at Calgary.

Major cycling-plant increases total to 285,000 M.c.f.d. Construction of the $10,000,000 cycling plant in St. Landry Parish, Louisiana, began this year. This plant will handle gas from the Krotz Spring unit. Facilities will be owned jointly by Gulf Refining Co., Humble Oil & Refining Co., and The Texas Co. Gulf will be the operator. Increase in capacity of the Elk City, Okla., cycling plant, operated by Shell Oil Co., will amount to 75,000 M.c.f.d.

It has been estimated that at least 12 new plants with total capacity of over 220,000,000 gal. annually of L.P.G. will be placed on stream in 1954. These include two plants in Canada and one in North Dakota.

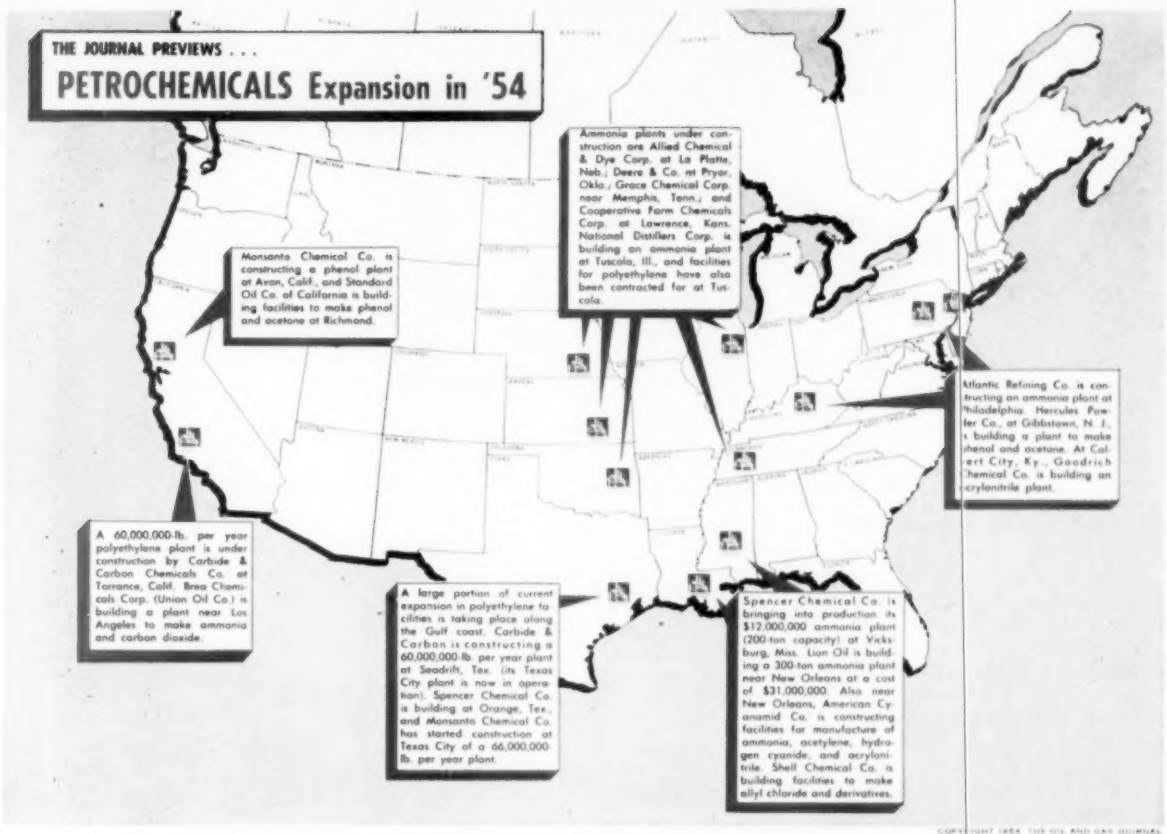
Although 1953 set a record in L.P.G. sales, it is expected that 1954 will be an even better year. Increased uses as bus and tractor fuel are expected. Propane's clean-burning properties are being confirmed in experiments made by Union Pacific Railroad Co.'s gas-turbine locomotives.

WHAT'S AHEAD

Another important trend is in the increased use of L.P.G. as a petrochemical feed stock. A sharp gain of about 17 per cent was shown in volume used for this purpose in 1953. Natural gas, it has been stated, has been rising in price and may not be available even at present prices in the future, making L.P.G. correspondingly attractive for petrochemical manufacture.

Extremely rapid development of underground storage facilities for L.P.G. will continue. It is estimated that nearly 70 projects have been completed through 1953 with capacity of over 200,000,000 gal. About 80 projects with a capacity of close to 300,000,000 gal. are under construction or planned. If enlargements of current storage are included, underground capacity in 1954 may come to about 8,500,000 bbl. Virtually all of present capacity is located in producing areas and it is expected that additional storage will first be installed in these same areas of Texas, Louisiana, Oklahoma, Kansas, and Mississippi. It is also felt, however, that underground storage is needed in market areas as well to achieve balanced production and movement of L.P.G.

Types of underground storage include: (1) washed-out cavities in salt beds and salt domes, (2) mined or natural caverns, and (3) depleted oil or gas reservoirs or water-sand formations. Largest number of projects are in washed-out salt beds. Depleted reservoirs generally have not been too successful. However, one company has reported high recoveries in a project involving dual injection of propane and butane in partially depleted gas sands. This is the La Gloria Corp. project conducted in cooperation with La Gloria Unit Operators.


THE JOURNAL PREVIEWS . . .
PETROCHEMICALS Expansion in '54
Ammonia plants under construction are Allied Chemical & Dye Corp. at La Platte, Neb.; Deere & Co. at Pryor, Okla.; Grace Chemical Corp. near Memphis, Tenn.; and Cooperative Farm Chemicals Corp. at Lawrence, Kans. National Distillers Corp. is building an ammonia plant at Tuscola, Ill., and facilities for polyethylene have also been contracted for at Tuscola.
Monsanto Chemical Co. is constructing a phenol plant at Avon, Calif., and Standard Oil Co. of California is building facilities to make phenol and acetone at Richmond.
Atlantic Refining Co. is constructing an ammonia plant at Philadelphia. Hercules Powder Co., at Gibbstown, N. J., is building a plant to make phenol and acetone. At Calvert City, Ky., Goodrich Chemical Co. is building an acrylonitrile plant.
A 60,000,000-lb. per year polyethylene plant is under construction by Carbide & Carbon Chemicals Co. at Torrance, Calif. Brea Chemicals Corp. (Union Oil Co.) is building a plant near Los Angeles to make ammonia and carbon dioxide.
A large portion of current expansion in polyethylene facilities is taking place along the Gulf coast. Carbide & Carbon is constructing a 60,000,000-lb. per year plant at Seadrift, Tex. (its Texas City plant is now in operation). Spencer Chemical Co. is building at Orange, Tex., and Monsanto Chemical Co. has started construction at Texas City of a 66,000,000-lb. per year plant.
Spencer Chemical Co. is bringing into production its $12,000,000 ammonia plant (200-ton capacity) at Vicksburg, Miss. Lion Oil is building a 300-ton ammonia plant near New Orleans at a cost of $31,000,000. Also near New Orleans, American Cyanamid Co. is constructing facilities for manufacture of ammonia, acetylene, hydrogen cyanide, and acrylonitrile. Shell Chemical Co. is building facilities to make allyl chloride and derivatives.

Petrochemicals Headed for Continued Expansion

CONTINUED expansion in ammonia and polyethylene manufacturing facilities appears to be the most important development for the petrochemical industry in 1954.

Other trends of importance are: (1) further increase in petroleum-detergent sales, (2) more phenol based on the cumene process, and (3) approach to a balance in the supply-demand situation for benzene.

Among new facilities expected to come on stream during the year will be a plant using a new process for acrylonitrile production, with expected decrease in the price of this important intermediate.

Progress in the sale of the Government's rubber and related facilities will be followed carefully.

A question of great interest to be answered in 1954 is what will happen to the Carthage Hydrocol gas synthesis plant, possible purchase of which is now under study by Stanolind Oil & Gas Co. in special arrangement with the RFC.

WHAT'S AHEAD

Synthetic ammonia . . . Capacity of this No. 1 petrochemical will receive a great boost when the many plants now under construction are completed through 1954-55. The accompanying map shows where these ammonia construction projects are located and gives an idea of their scope in terms of capacity and capital investment. Two of these projects are based on byproduct hydrogen. The rest are based on natural gas. This serves to emphasize the prediction that ammonia derived from natural gas soon will account for more than 80 per cent of total ammonia production.

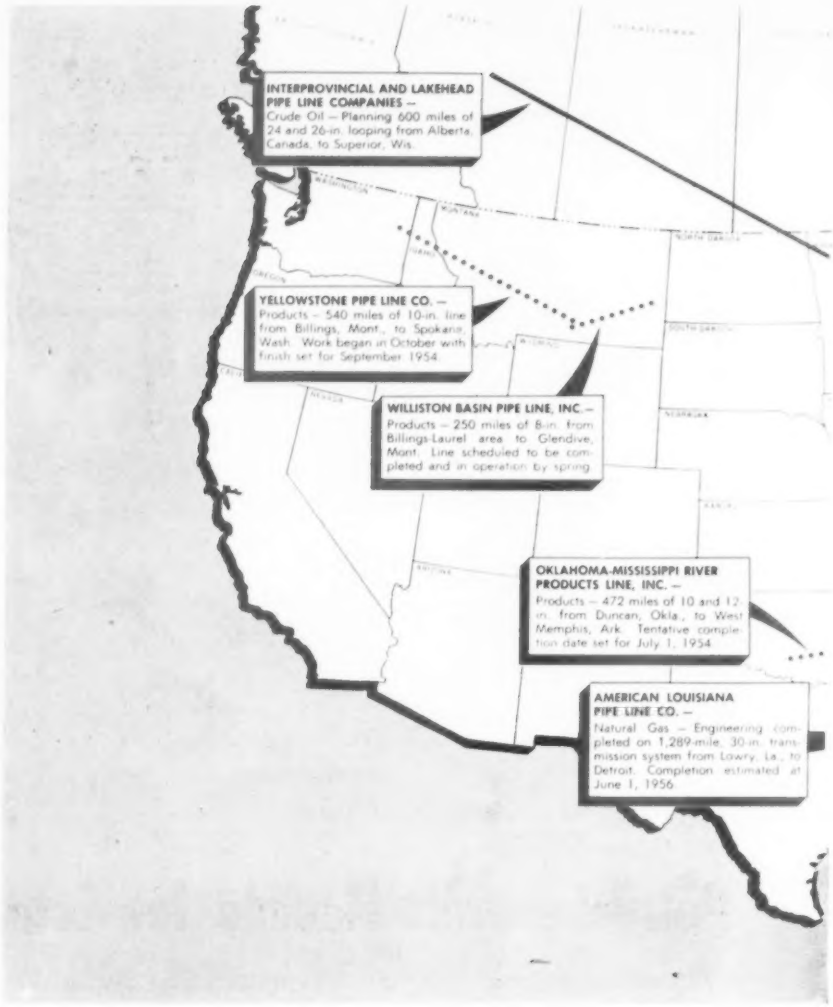
A trend being watched in ammonia processing is the employment of the partial oxidation method in synthesis gas manufacture. First plant to employ this method will be that of Spencer Chemical Co. at Vicksburg, Miss., which may be going into production as this is written or shortly thereafter.

Polyethylene push . . . Bakelite Co., division of Union Carbide & Carbon Corp., now has in full operation at Texas City, Tex., a 60-million-pound per year polyethylene plant. Two more 60-million-pound per year plants are being constructed by Carbide & Carbon. Monsanto Chemical Co. recently let contract for construction of a 66-million-pound per year plant at Texas City. Others involved in polyethylene expansion are Spencer Chemical Co., National Petro-Chemicals Corp., and Dow Chemical Co.

More phenol . . . Synthetic phenol capacity is being expanded. A new trend here is manufacture of phenol from cumene. This process, it is estimated, will account for 80,000,000 lb. of phenol in 1954 or about 14 per cent of total estimated production for the year.

Balanced benzene . . . An excess benzene capacity by 1955 is a possibility and benzene prices have been cut. However, no drastic cuts are in prospect.

WHAT'S AHEAD


INTERPROVINCIAL AND LAKEHEAD PIPE LINE COMPANIES –
Crude Oil – Planning 600 miles of 24 and 26-in. looping from Alberta, Canada, to Superior, Wis.
YELLOWSTONE PIPE LINE CO. –
Products – 540 miles of 10-in. line from Billings, Mont., to Spokane, Wash. Work began in October with finish set for September 1954.
WILLISTON BASIN PIPE LINE, INC. –
Products – 250 miles of 8-in. from Billings-Laurel area to Glendive, Mont. Line scheduled to be completed and in operation by spring.
OKLAHOMA-MISSISSIPPI RIVER PRODUCTS LINE, INC. –
Products – 472 miles of 10 and 12-in. from Duncan, Okla., to West Memphis, Ark. Tentative completion date set for July 1, 1954.
AMERICAN LOUISIANA PIPE LINE CO. –
Natural Gas – Engineering completed on 1,289-mile, 30-in. transmission system from Lowry, La., to Detroit. Completion estimated at June 1, 1956.

Products, Natural-Gas Projects

Three big Louisiana-northeastward trunk

PIPE-LINE construction in the United States in 1954 will be dominated by refined-products and natural-gas projects. Already 2,400 miles of products lines are under way and 2,900 miles are planned for the future. Natural-gas lines under way total 3,300 miles. More than three times as many are proposed for future expansion. Crude-oil lines under way and planned for the future total 2,850 miles.

In 1953—a year notable for big new crude-oil lines—approximately 13,700 miles were completed in the United States and 2,010 miles abroad giving a total of 15,710 miles in the world.

Work promises to be under way in 1954 for three big trunk lines running northeastward from Louisiana: Gulf Interstate Gas Co.'s line now being built to the West Virginia border, American Louisiana Pipe Line Co.'s proposed line to Detroit, and Tennessee Gas Transmission Co.'s line to Portland, Tenn.

Two big lines to transmit gas from Pennsylvania underground storage fields to the New York-New Jersey area will be built by Tennessee Gas Transmission Co. and Texas Eastern Penn-Jersey Transmission Corp.

In the first half of 1954, construction will be in progress on three important products lines. For two of these —Yellowstone Pipe Line Co. and Oklahoma Mississippi River Products Line, Inc.—work is now under way. The third is that of Badger Pipe Line Co. which starts in the spring in Wisconsin.

Others in prospect for later construction are the lines of Triangle Pipe Line Co., Williston Basin Pipe Line Co., and International Pipe Line, Inc.

The big crude-oil project is the 600-mile looping of the Interprovincial and Lakehead Pipe Line Co. systems.

Projects and Costs

Future projects with maximum capacities and investment costs are given below.

Cities Service Pipe Line Co., Houston to Sour Lake, Tex., 60 miles, 12-in., 60,000 bbl. Estimated cost $2,654,000.

Interprovincial and Lakehead Pipe Line Co.'s looping, Edmonton, Alta., to Superior, Wis., 600 miles, 24-26-in.

Sinclair Pipe Line Co., Pauls Valley, Okla., loop, 10 miles, 12-in., 24,000 bbl. $817,000.

Trans Mountain Oil Pipe Line Co., Sumas to Ferndale, Wash., 26 miles, 16-24-in., 35,000 bbl., $2,750,000.

Proposals for building the West Coast Pipeline Co. project are still in the negotiation stage. These involve the 1,030-mile, 20-24-26-in. crude line from Midland, Tex., to Norwalk, Calif. for 300,000 bbl. daily to cost $111,534,000. Connected with this is the proposal for Proven Oil & Refining Co.'s Florence, Ariz., 32-mile, 8-in. takeoff with 15,000 bbl. capacity to cost $767,000.

Plans for the proposed Sioux Pipe Line System are being studied by Shell Pipe Line Corp. for a group of Williston basin crude-oil-producing companies. Several routes have been proposed. Selection of the route and preliminary engineering studies are not expected until spring. *(The Oil and Gas Journal, December 21, 1953, page 112.)*

Products Lines

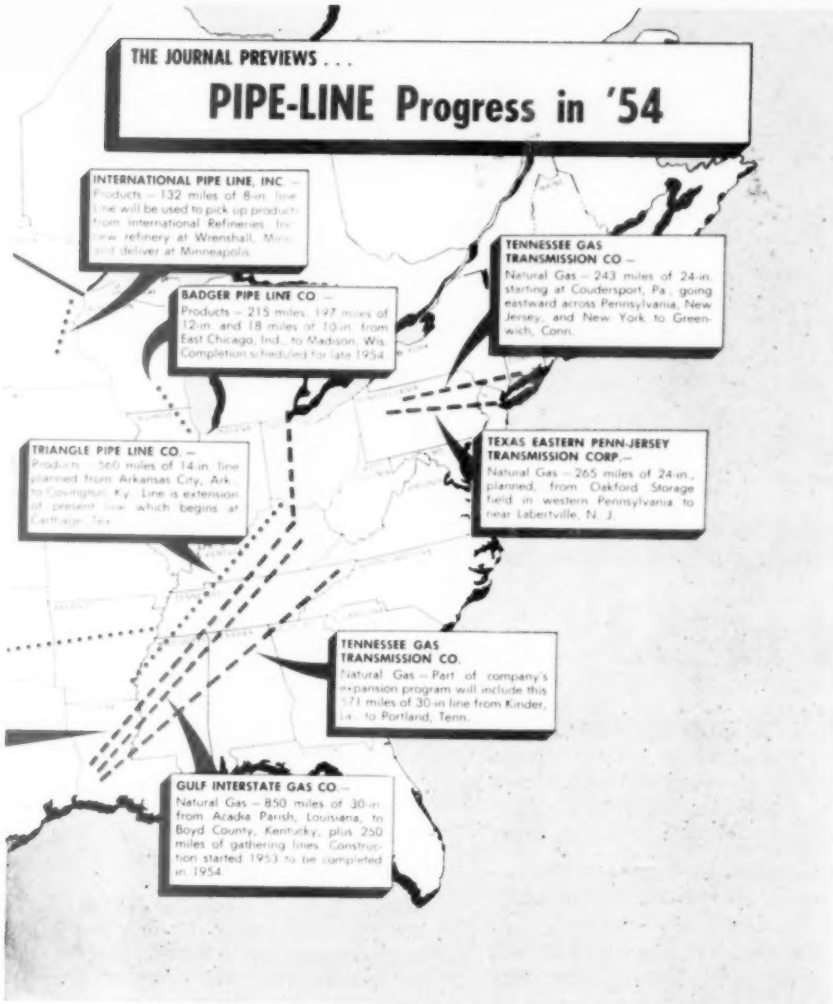
Badger Pipe Line System (Cities Service, Sinclair, Pure, and Texas interests), East Chicago, Ind., to Madison, Wis., 215 miles, 8-10-12-in., 65,000 bbl., $15,000,000, to be started in the spring.

International Pipeline, Inc., Wrenshall, Minn., to Minneapolis, 132 miles, 8-in., 25,000 bbl., $4,350,000.

Shamrock Oil & Gas Corp., McKee to Amarillo, Tex., 55 miles, 6-in., 18,000 bbl., $1,151,000.

Triangle Pipe Line Co., Arkansas City to Covington, Ky., 560 miles, 12-in., 75,000 bbl., $24,541,000.

Williston Basin Pipe Line, Inc.,


THE JOURNAL PREVIEWS . . .
PIPE-LINE Progress in '54
INTERNATIONAL PIPE LINE, INC. — Products — 132 miles of 8-in. line. Line will be used to pick up products from International Refineries, Inc. new refinery at Wrenshall, Minn. and deliver at Minneapolis.
BADGER PIPE LINE CO. — Products — 215 miles, 197 miles of 12-in. and 18 miles of 10-in. from East Chicago, Ind., to Madison, Wis. Completion scheduled for late 1954.
TENNESSEE GAS TRANSMISSION CO — Natural Gas — 243 miles of 24-in. starting at Coudersport, Pa., going eastward across Pennsylvania, New Jersey, and New York to Greenwich, Conn.
TRIANGLE PIPE LINE CO. — Products — 560 miles of 14-in. line planned from Arkansas City, Ark., to Covington, Ky. Line is extension of present line which begins at Carthage, Tex.
TEXAS EASTERN PENN-JERSEY TRANSMISSION CORP. — Natural Gas — 265 miles of 24-in., planned, from Oakford Storage field in western Pennsylvania to near Lebertville, N. J.
TENNESSEE GAS TRANSMISSION CO. — Natural Gas — Part of company's expansion program will include this 371 miles of 30-in line from Kinder, La., to Portland, Tenn.
GULF INTERSTATE GAS CO. — Natural Gas — 850 miles of 30-in. from Acadia Parish, Louisiana, to Boyd County, Kentucky, plus 250 miles of gathering lines. Construction started 1953 to be completed in 1954.

Lead in Projected Expansion

lines will get under way during current year

Laurel to Glendive, Mont., 248 miles, 6-8-in., 21,000 bbl., $5,181,000.

Oklahoma - Mississippi River Products Line, Inc., Duncan, Okla., to West Memphis, Ark., 475 miles, 10-12-in., 46,000 bbl., $16,786,000, now under construction.

Salt Lake Pipe Line Co., Adams, Ore., to Pasco, Wash. (loop), 40 miles, 6-in., 7,000 bbl., $1,790,000.

United States Government Alaskan Products Pipe Line, Haines, Alaska, via Canada to Fairbanks, Alaska, 600 miles, 8-in., contracted.

Yellowstone Pipe Line Co., Billings to Spokane, Wash., 540 miles, 10-in., 30,000 bbl., $20,500,000, building.

American Pipe Line Corp., proposes a line from Beaumont, Tex., to Newark, N. J., with laterals, 1,910 miles, 8 to 26-in., 300,000 bbl., $145,337,000.

In Europe, United States interests are engaged in building the following products lines:

North Atlantic Treaty Organization (NATO), Western Europe connections with U. S. Government's St. Nazaire-Metz, France, line, 1,920 miles, 4 to 10-in.

United States Government, St. Nazaire to Melun and Metz, France, 375 miles, 12-in.

Natural-Gas Lines Planned

American Louisiana Pipe Line Co., Lowry, La., to Detroit, Mich., 1,289 miles, 8 to 30-in., 300,000,000 cu. ft., $130,000,000.

Gulf Interstate Gas Co., Acadia Parish, Louisiana, to Boyd County, Kentucky, 860 miles, 30-in., trunkline, and 300 miles of gathering lines, 375,000,000 cu. ft., $129,541,000, to be completed in 1954 for transmitting gas for Columbia Gas System, Inc.

Michigan-Wisconsin Pipe Line Co., loops principally in Illinois, 252 miles, 4 to 24-in., 100,000,000 cu. ft., $11,435,000.

Tennessee Gas Transmission Co., Kinder, La., to Portland, Tenn., 571 miles, 30-in.

Tennessee Gas Transmission Co., Coudersport, Pa., to Greenwich, Conn., 243-mile, 24-in., and 28-mile, 24-in. lateral from Greenwich, Conn. to Newark, N. J., 180,000,000 cu. ft., $33,677,000.

Texas Eastern Penn-Jersey Transmission Co., Oakford Storage to Lambertville, N. J., 265 miles, 24-in.

Texas Gas Transmission Co., loop, Lake Cormorant, Miss., to Slaughter, Ky., 48 miles, 26-in., 51,000,000 cu. ft., $4,281,135.

Transcontinental Gas Pipe Line Corp., looping along Texas-New York line, 533 miles, 30-36-in.

Pacific Northwest Pipe Line Corp. is seeking authorization to build an 1,846-mile line from Ignacio, Colo., to Bellingham, Wash., to serve Washington and Oregon markets.

Also in competition for Washington-Oregon markets is Westcoast Transmission Co. with a proposed 1,110-mile trunk line from Dawson Creek, B. C., to Vancouver, B. C., with extensions to Tacoma, Wash., and Portland, Ore., and a 280-mile, 20-in. line from Pincher Creek, Alta., to Spokane, Wash.

PIPE-LINE PROJECTS COMPLETED IN 1953

	United States, Miles	Foreign, Miles
Crude	5,200	1,150
Products	3,400	750
Natural Gas	5,100	110
Totals	13,700	2,010

Grand Total, 15,710 miles

SEISMIC CREW at work on a geophysical prospect in the Rocky Mountain region.

DEVELOPMENTS OF THE YEAR

EXPLORATION in '53 . . .

as seen by Journal staffers and contributors

FUNDAMENTL RESEARCH in both geology and geophysics highlighted exploration developments during 1953 as indicated by the following 12 leading exploration articles selected from the pages of The Oil and Gas Journal during the past year. Seismic and gravity methods came in for basic reevaluation in prospecting.

In the field of geology, reports were published on basic studies of sedimentation and structure. Near-shore Recent sediments and their environments in the northern Gulf of Mexico and studied by the American Petroleum Institute were significant contributions to geologic literature. Reef structures were critically reevaluated and redefined by one authority.

In the field of geophysics, the entire field of gravity prospecting was analyzed in one major symposium conducted by the nation's leading geophysicists. Another major conference concerned itself with the very important topic of seismic velocities.

Exploration techniques currently employed in various geologic provinces of the nation and successes in finding oil and gas-bearing structures were reviewed in important contributions to the literature. Significant studies were published on the Williston basin and intermontane basins of the Rocky Mountain region and the entire Gulf of Mexico.

1 Rockies Are Top Future Province . . . Judging from the rapid buildup of exploratory forces in the Rocky Mountain area, geologic thinking today points to the Rockies as the best future province for exploration. Many of these basins are deep and several go way down below the current 20,000-ft. "basement." Oil has been found in the Rockies in these basins throughout the geologic column from Cambrian to Tertiary. Although the obvious big, surface-expressed structures have been drilled, there remain many oil-bearing structures that can be found by subsurface studies and the reflection seismograph.

Reference: "Rockies Are Top Future Province," by P. C. Ingalls, The Oil and Gas Journal, August 31, 1953, page 163.

2 Geology of the Gulf Coast . . . The Gulf Coast geologic province extends around the Gulf of Mexico for a distance of 700 miles. About 250 miles of the line is in Louisiana, the remainder in Texas; width of this band is roughly 140 miles. Sediments were deposited on flood plains crossing coastal plains, massed in dunes and bars near the beaches, and spread over the floor of the gulf during the entire area.

Seaward migration of the transition zones has determined the positions of productive trends or "fairways" which are located slightly seaward of the transition zone in each formational unit. Favorable conditions for accumulation of oil and gas along those productive trends are due partly to the mutual proximity of source and reservoir rocks.

Reference: "Here's a Roundup of Some Current Views on Geology of the Gulf Coast" prepared by the field-trip committee of the joint annual meeting of the A.A.P.G., S.E.P.M., and S.E.G., Houston, March 1953, The Oil and Gas Journal, June 22, 1953, page 249.

3 Exploratory Drilling in South Dakota . . . The South Dakota end of the Williston basin contains up to 10,500 ft. of sediments which thin to less than 2,500 ft. along the east platform; thinning results primarily from successive pinchouts. Pinched out completely before reaching the outcrop are Upper Ordovician, Silurian, Devonian, Middle and Upper Mississippian rocks.

Cretaceous possibilities are (1) Newcastle or Muddy production on the east flank of the Black Hills uplift, (2) traps in tongues of the Dakota sandstone which pinch out to the west into the Graneros shale west of the axis of the Lemmon syncline, and (3) accumulations in either pinchouts or structures developed in the extreme northwest corner of the state in either the Muddy or Eagle sandstones.

Reference: "South Dakota Steps Up Exploration," by John Paul Gries, The Oil and Gas Journal, July 20, 1953, page 114.

4 Oil Development in Santa Clara Valley . . . Santa Clara Valley, extending inward from the Pacific Ocean about 50 miles from its mouth near Ventura, has contributed substantially to increased oil production in California during the past 2 years. Current production from the valley's accumulations is about 74,000 bbl. daily, as compared with 47,500 bbl. at the first of 1951. Three discoveries

of the past year, Torrey Canyon deep Sespe, Oakridge, and South Tapo Canyon, have produced substantial portions of the new gains.

Representing one of the most concentrated searches of any California region, more than 130 exploratory wells were drilled during the past 2 years, resulting in a total of 16 discoveries including new pays.

Reference: "Sixteen Discoveries in 2 Years," by D. H. Stormont, California district editor, The Oil and Gas Journal, July 20, 1953, page 170.

5 Seismic Work in the Eastern Gulf . . . Principal exploration interest in southern Alabama and northwestern Florida at the present time is centered in the lower part of the Upper Cretaceous beds. This formation is the familiar Woodbine sandstone of northeastern Texas; it is correlated at the time rock equivalent of the middle and lower Tuscaloosa of Mississippi and Alabama and the middle and lower Atkinson formation of southern Georgia and northern Florida.

Refraction techniques are being employed throughout the land areas of Florida and in its waters along the western coast; results are considered favorable.

Reference: "Favorable Geologic Conditions and Recent Oil-Field Successes Indicate a Continuance of Field Development and Exploration Activity in the Southeastern States," by Robert B. Baum, The Oil and Gas Journal, February 23, 1953, page 183.

6 Role of Gravity in Exploration . . . Detailed gravity surveys can be profitably used (1) for reconnaissance to direct seismic operations if the gravity surveys are accurate, have adequate spacing for the area's particular problem, and above all, are of high quality; (2) to aid geologists in mapping in that gravity may provide the tipoff on how to arrange faults and how to move on structure; (3) to aid the seismologist when data are ambiguous; (4) to locate well sites in nonreflection areas; (5) for rapid information on entering frantic land plays; (6) for detailed quantitative analysis of individual structures, especially around salt domes; and (7) to develop new prospects by frequent review of gravity maps in the light of information which has become available from other sources.

Reference: "Role of Gravity in an Exploration Program," a symposium conducted by the Geophysical Society of Tulsa, The Oil and Gas Journal, September 28, 1953, page 106.

7 Symposium on Velocity Surveys . . . A velocity survey does at least three things. It identifies reflections, ascertains over-all velocities, and defines interval velocities.

The fundamental equation of the reflection is:

$$Z = Vt/2$$

where Z = the depth, t = vertical reflection time, and V = corresponding average velocity. This formula shows that an error of 0.01 second either in the measurement of or the assumption concerning the velocity to depth Z is equivalent to an error of 0.02 second in the measurement of reflection time.

Effective use of velocity-survey data; techniques for improvement of survey accuracy; improvement of quality of first breaks; analysis of time-measurement problems; analysis of how much control is needed; and the value of velocity surveys are discussed.

Reference: "The Need for Quantity and Quality in Velocity Surveys," a symposium conducted under the auspices of the Geophysical Society of Tulsa, The Oil and Gas Journal, March 30, 1953, page 119.

8 Geology Research for Future Oil Traps . . . A.P.I. Research Project 51 has thus far covered the study of near-shore Recent sediments and their environments in the northern Gulf of Mexico. No fewer than 14 different environments have been defined, 7 in the bays, 4 within the barrier islands, and 3 on the Continental Shelf of the open Gulf of Mexico. These include: bays near mainland; bays near rivers; bays near oyster reefs; bays, intermediate type; bays, no special influence; bays near narrows; bays near barriers; barrier flats, inlets, dunes; gulf beaches, near-shore gulf; and outer shelf.

Reference: "Guides to Future Oil Traps Indicated by Study of Near-Shore Recent Sediments and Their Environments in the Northern Gulf of Mexico," by Francis P. Shepard and Clarence L. Moody, The Oil and Gas Journal, November 16, 1953, page 228.

9 A Critical Analysis of Reef Structures . . . Reefs are composed only in small part of the essential wave-resistant framework. The greater part of the reef is composed of various kinds of mechanically deposited material.

The Capitan reef in the Permian basin is described by the author to have been a true reef with algae forming the main part of the wave-resistant framework. Seaward from the reef was the Delaware basin where clastic sand and shale with a little dark-colored limestone was deposited. On the other side of the reef was a shallow basin of deposition where the sediments were predominantly evaporites. The feature, a true barrier reef, formed a barrier between the two basins.

Reference: "Reefs and Associated Rocks," by E. Russell Lloyd, The Oil and Gas Journal, July 27, 1953, page 268.

10 Geologic Study Explains Tilted Water Table . . . Northwest Lake Creek field is on the southwest flank of the Big Horn basin in Wyoming. Originally, the interstices of the sediments were filled with saline waters; oil and gas were confined in the Tensleep sandstone in conventional relationship with the geometry of the structure. Subsequent replacement of saline formation waters by meteoric waters—and related flow—forced the gas and much of the oil from the crest of the anticline. A small portion of the oil found a position of rest in the energy field at a small and local culmination along the anticlinal plunge.

Reference: "Geologic Study Explains Tilted Water Table at Northwest Lake Creek Field," by T. H. Green and C. W. Ziemer, The Oil and Gas Journal, July 13, 1953, page 178.

11 New Technique in Subsurface Geology . . . Percentage-of-thinning charts offer the subsurface geologist another aid in his studies of stratigraphic thickness change. By correlating periods of thickness change on a regional scale, certain isopach anomalies may be stratigraphic in origin or due to localized structural movement.

The worker is able to study the "thickness" behavior of an entire section and compare it to other entire sections in the same illustration. Vertical perspective is added to augment the limited horizontal perspective of the single unit isopach map.

Reference: "New Technique in Subsurface Geology . . . The Percentage of Thinning Chart," by A. H. Wadsworth, Jr., The Oil and Gas Journal, March 2, 1953, page 72.

12 Want to Lease From Uncle Sam? . . . Administration of the oil, gas, and mineral resources of the federal Government's public lands is vested in the Interior Department and conducted through the Bureau of Land Management and the Geological Survey. Regulations for operations on the public lands are based on the Mineral Leasing Act of February 25, 1952, as subsequently amended.

More than one-half of the land is administered by the Interior Department, but the Department of Agriculture holds some 16[illegible],000,000 acres or more, the military possess more than 20,000,000 acres, and other agencies hold in excess of 1,000,000 acres.

Reference: "Want to Lease From Uncle Sam?" by Bertram F. Linz, Washington district editor, The Oil and Gas Journal, August 24, 1953, page 100.

DEVELOPMENTS OF THE YEAR

DRILLING in '53 . . . *as reflected in representative Journal articles*

BEST evidence of progress in the drilling industry during the past year is the fact that while costs were climbing on all sides, footage price of drilling contracts has risen little or not at all.

Expanded use of jet bits and carefully planned mud programs get much credit for keeping costs down through better penetration rates. However, generally better usage of equipment and a willingness to adopt improved practices account for much of the progress.

Hydraulic-fracturing treatments are yielding remarkably better completions in many areas. Moreover, in some fields fracturing is spelling the difference between commercial and noncommercial production.

Another significant development in completion practices was the perfection and licensing of the permanent-type well-completion techniques. These methods should come into common usage because the drilling rig has only to run tubing after casing is set; and several days' rig time are thereby saved.

The year end brought a greatly accelerated building program for barges and other offshore equipment.

The near future should see a record number of overwater rigs in operation.

Symbolic of the industry's advancement was the new record of 21,482 ft. recently set for deep drilling, which was almost 1,000 ft. deeper than man had ever before drilled.

1 California Well Drills to 21,482 Ft. to Set New Depth Record . . . After 2 years of continuous drilling, the Ohio Oil Co. set a new well depth record with its deep test in Paloma field near Bakersfield, Calif. After setting 9⅝-in. casing at 10,953 ft. (one of the heaviest casing strings on record), the 8¼-in. hole was cored almost continuously to 21,482 ft. A fishing job has interrupted operations, and possible deeper drilling hinges on the next few feet of cores.

This deep test was spudded on October 23, 1951, to test deep oil possibilities of the Paloma structure. Objectives of the deep test were the Point of Rocks sand, of Eocene age, and the Oceanic sand, of Oligocene age. These two sands are prolific oil producers in the Cymric and Belgian anticline fields on the west side of the San Joaquin Valley, about 27 miles northwest of the Paloma test.

Reference: "How World's Deepest Well Was Drilled," by D. H. Stormont, California district editor, The Oil and Gas Journal, October 5, 1953, page 260.

2 Increased Overwater Activity Brings Construction of Largest Drill Barge . . . A four-deck drilling barge with an over-all length of 237 ft. and over-all width of 54 ft. is the largest ever built for overwater drilling. Designed for inland waters, the barge can drill in depths up to 14 ft. The various components of the rig itself are located on three levels and include an auxiliary draw works and a derrick that can handle five joints of drill pipe in a stand.

Reference: "World's Largest Drilling Barge," by F. L. Resen, Gulf Coast district editor, The Oil and Gas Journal, February 9, 1953, page 98.

3 Percussion Bit Seen as Key to Faster, Straighter Hole . . . Significant improvement in drilling rates can be brought about only by making more power available at the bottom of the hole and by using it percussively, at least in part. Study currently being conducted on percussive equipment, hydraulically actuated, is proceeding with marked success. Transmitting electric power to the bottom of the hole also appears promising.

It has been found that percussive frequencies need not be above 300 blows per second.

Reference: "How to Increase Drilling Rates," by John V. Pennington, The Oil and Gas Journal, November 16, 1953, page 245.

4 High-Injection Rate, Big-Volume Fracturing Improves Spraberry Completions . . . Hydraulic fracturing treatments employing pumping rates up to 66 bbl. per minute have boosted

oil production from all wells in which it has been tried in the Spraberry trend. Each treatment used 31,000 lb. of sand and 21,000 gal. of oil, and seven pump trucks were needed to give the high pumping rates.

Wells previously producing 25 bbl. or less responded by increasing to 100, 200, and 300 bbl. per day.

Possible high friction losses due to the high pumping rates have been reduced by treating "down the casing." For stream-lined hookup of the multiple pumping units, a special well-head manifold, permitting direct connection from each truck to the well head, was designed. High pump efficiency is obtained by positive flooded suction.

Reference: "Recovering Spraberry's Reluctant Oil," by T. P. Brooks and W. E. Life, The Oil and Gas Journal, December 28, 1953, page 66.

5 Knowing Controlling Factors of Fracturing Helps Select Right Wells for Treatment . . . The most realistic approach to predicting fracture pressures for oil and gas wells is a statistical analysis of the pressures already experienced. If the fracturing fluid penetrates the formation, the lowest fracturing pressures will be experienced in formations having least homogeneous permeability.

These 2 and 17 other key factors affecting the behavior of formations in oil and gas wells will, if observed, give best insurance for the success of a fracturing job.

Reference: "Hydraulic Fracturing of Oil and Gas Wells," by Roscoe C. Clark, Jr., The Oil and Gas Journal, September 14, 1953, page 122.

6 Permanent-Type Completion Provides Economy, Safety, and Uncontaminated Pay . . . A saving of as much as 60 per cent has been reported on certain types of workovers performed on permanently completed wells. Rig time is shortened for original completions and eliminated completely for workover. There is greater over-all safety because perforating is done after well head and tubing are in place.

As mud is not used after casing is set, contamination is reduced. Moreover, better reservoir information usually results because of reduced testing cost.

Other advantages which accrue when using the method are: (1) Squeezing and testing can be done without special packers and tools; (2) squeezing pressures are lower, and service is lighter for casing and tubing; (3) due to high pressure differential during perforation, plugging during perforation is prevented, and (4) corrosion inhibitor may be added with greater ease.

Reference: "Equipment for Permanent-Type Well Completions," by Ed McGhee, Tulsa district editor, The Oil and Gas Journal, December 7, 1953, page 111.

7 Power Pumps Can Be Compounded for Modern Jet-Bit Drilling . . . Compounding of power pumps in jet-bit drilling operations makes available higher hydraulic horsepower at the bit. At the same time flexibility in the pumping system is maintained. The pressure-volume relation of many pumps is such that jet-bit drilling may be practiced through parallel application at shallow depths and compound application at greater depths.

Minimum equipment necessary are pulsation dampeners, vibration hoses, and suction-line valves or line blinds.

Pump repair and maintenance costs may vary as widely as do operating pressures and mud properties. During a 6-month period in 1952 the average daily pump cost for operating a 700-hp. pump was $46.22. This compares with a total daily average cost of $48.00 where two 425-hp. pumps were operated in parallel at slightly lower pressures. Average daily cost over 1 year on two pumps operated in series was $58.40.

Reference: "Compounding of Pumps for Jet-Bit Drilling," by R. J. Meers, The Oil and Gas Journal, November 2, 1953, page 114.

8 Hydraulic Units Add Flexibility and Effectiveness to Drilling Rigs . . . Hydraulic units enable drilling-rig engines to be used with maximum effectiveness, thus making available more horsepower from an engine of a given rating. When using hydraulic couplings, load is accelerated smoothly and steadily to maximum speed without stalling. Torque converters reduce shock loadings and increase efficiency and ease of operation.

Field experience has shown that rigs with these units have lower operating and maintenance expense and higher second-hand value.

Reference: "Use of Hydraulic Units in the Oil Field," by E. L. Phillips, The Oil and Gas Journal, March 9, 1953, page 98.

9 Growing Investment in Wire Rope Protected by Proper Care and Use . . . The average rig's investment in wire rope is increasing as deeper drilling and increased loadings necessitate more expensive lines and more stringent cutoff practices. Knowing the proper care of wire line includes proper hauling, breaking in, seizing and cutting, splicing, applying clips, sizing of drums and sheaves, constructing slings, and aligning rope carriers.

Safety and economy are the result of proper care and use.

Reference: "Care and Use of Wire Rope, a Series," courtesy A. Leschen & Sons Rope Co., The Oil and Gas Journal, March 2 through September 14, 1953.

10 Use of Bentonite Improves Many Cement Properties . . . Extensive field experience and laboratory data show that the properties of cements containing 8 to 12 per cent of bentonite are satisfactory for use in wells with formation temperatures ranging from 100° to 250° F. By varying the concentration of calcium lignosulfate with depth, these cements have been used successfully in several thousand wells during the past 4 years.

Advantages are low-density slurries, low set strength, better squeeze-cementing results, and savings on the cost of cementing materials.

Reference: "New Light on Use of Bentonite in Cements," by B. E. Morgan and G. K. Dunbauld, The Oil and Gas Journal, April 20, 1953, page 131.

11 Modern Drilling Muds Give Increased Rates of Penetration . . . Best increases in penetration rates traceable to drilling mud has been experienced with oil-emulsion muds. Colloidal clays and heavily weighted muds follow in that order. The superiority of the oil-emulsion fluids is due to the reduction of torque and hole friction, prevention of bit balling, and better lubrication of bit and cutter bearings.

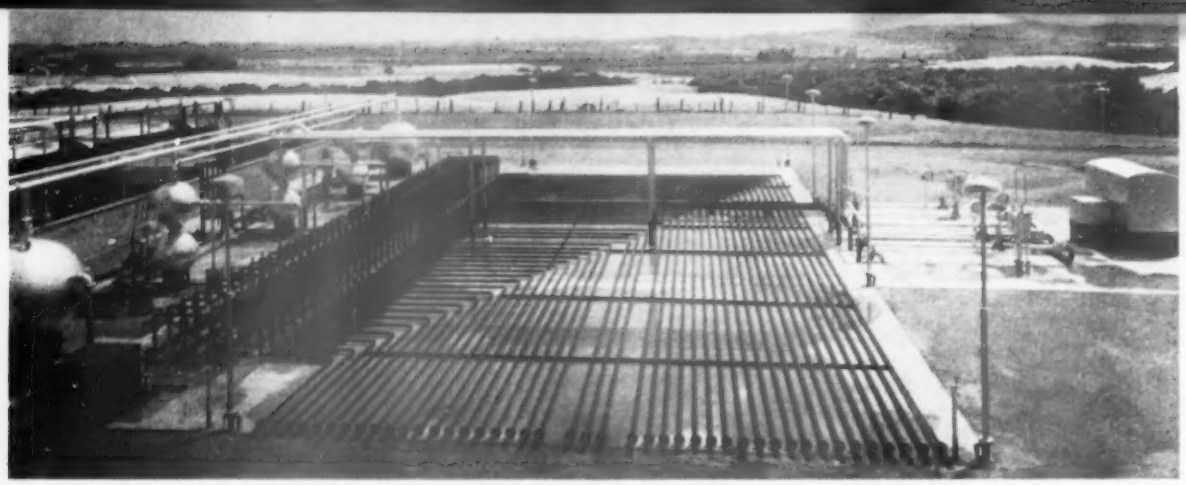
The line-starch muds are marked by their capacity of withstanding rather high concentrations of formation contaminants.

Reference: "A.A.O.D.C. Drilling Muds Technical Report," by J. S. Bell, R. W. Waddell, E. H. Lancaster, and J. D. Hawkins, The Oil and Gas Journal, October 19, 1953, page 124.

12 Rocky Mountain Drilling Changes Drastically in Short Distances . . . Drilling problems in the Rocky Mountains differ from basin to basin, and penetration rates differ from one formation to another. The thick sedimentary sections of the intermontane basins are seeing intensified exploration and development drilling as a result of recent completion of major crude pipe lines.

To point up drilling problems, the Journal compiled an analysis of wells from each major basin. Emphasized are penetration rates; bit performance; rig-time distribution; cementing practices; and mud, bore-hole, and casing programs.

Reference: "Fifty Case Histories in Thirteen Rocky Mountain Areas," The Oil and Gas Journal, October 5, 1953, page 159.



New "push-button" oil-gas separation installation of Shell Oil Co. in California.

DEVELOPMENTS OF THE YEAR

PRODUCTION in '53 . . .

as written and pictured in Journal issues

PETROLEUM production engineering made substantial strides in 1953 and even more impressive gains are in sight for 1954. The most noteworthy trend of advancement continues to be in the betterment of the various oil recovery processes. Water-injection operations which 18 years ago were confined exclusively to the Bradford, Pennsylvania, field, are now long extended beyond the more recent confines of the shallow fields of northern Oklahoma-southern Kansas. And water-flood operations last year progressed in application to depths below 10,000 ft. Gas repressuring, similarly in years past was confined to the low-pressure "sweep" variety. Then came the pioneering pressure-maintenance work at Villa Platte, La. But, this last year saw the field operation and expansion of the new-type high-pressure "gas-liquid-miscibility" principle (in gas injection) in Block 31 field, Crane County, West Texas.

In the same manner as for oil recovery, new developments are coming rapidly in more economical and more efficient equipment. As a matter of fact, electrical control operations are in routine usage already in certain oil fields. Push-button operation of wells and batteries can be expected to grow in the future. Other interesting advances are being made in oil-well pumping, gas-lift operation, oil-gas separator and tank-battery hookups, corrosion control, and on many other oil-production fronts.

1 Study Course for Petroleum Engineers—"ABC's of Supervision" . . . In 1953, petroleum engineers working in drilling, production, refining, and pipe lines became more concerned than ever before about learning the principles of proper supervision. Neither engineering office work nor field construction can go unsupervised. Engineers accordingly are increasingly confronted with problems of properly supervising the engineering developments and projects they have originated.

In supervising each and every oil construction and operational program, supervisors must have the answer to these questions: How shall I instruct? Am I sure he knows how? Does training ever stop? Delegate responsibility? How plan the technique? Establish fair standards? Analyze total job? Shall I sell my idea—or force it? How allocate personnel?

Reference: "ABC's of Supervision," special section in The Oil and Gas Journal, February 16, 1953.

2 In-Situ Combustion—Newest Method of Increasing Oil Recovery . . . The quantity of the so-called "unrecoverable heavy oils" in the United States is in excess of 4 billion barrels. Magnolia Petroleum Co. proposes igniting the reservoir oil so that it will burn in a slowly advancing high-temperature front. By raising the reservoir temperature, with consequent reduction in oil viscosity, substantial increase in ultimate oil recovery is possible. Laboratory tests show recoveries of over 60 per cent, frequently as high as 90 per cent, or original oil in place.

Reference: "In-Situ Combustion—Newest Method of Increasing Oil Recovery," by C. S. Kuhn and R. L. Koch, Magnolia Petroleum Co., Dallas, The Oil and Gas Journal, August 10, 1953, page 92.

3 Which to Use—"I" Type or "M" Type—in High-Pressure Gas Injection? . . . When gas is injected into a reservoir at high pressures, an exchange of hydrocarbon components takes place between the gas and oil, resulting in a modification of the properties of both phases. The rich displacing gas may be either miscible or immiscible with the reservoir oil. If gas is miscible, phase boundary is removed, and most of the effects of capillarity are overcome. Result is that the displacement process becomes similar to that of oil by gasoline. Hence, nearly all the oil in the pore spaces contacted by the displacing phase is displaced.

Reference: "Which to Use—'I' Type or 'M' Type—in High-Pressure Gas Injection?" by R. L. Slobod and H. A. Koch, Jr., Atlantic Refining Co., Dallas, The Oil and Gas Journal, April 6, 1953, page 84.

4 Using Cycling Displacement Patterns and in Graphical Relationships, for Cycling Projects . . . Maximum recovery of rich reservoir gas by cycling the residue gas continues to be a subject of considerable interest, and efforts are being made to develop more accurate methods for predicting recovery. Most of these answers can be obtained empirically using laboratory electrolytic models.

Reference: "How Cycling Works to Achieve Maximum Distillate Recovery," by Dr. Judson S. Swearingen, Southwest Research Institute, San Antonio, The Oil and Gas Journal, June 22, 1953, page 283.

5 New Method of Calculating Recovery of Light Hydrocarbons by Gas Cycling . . . In gas cycling in semi-depleted dark oil sands to recover light hydrocarbons, newly developed cycling equations make it possible to determine rapidly the composition of effluent gas at any time. Factors controlling the recovery are the composition of reservoir oil and gas phases, composition of injected gas, permeability variations of the reservoir, cycling temperature and pressure, and well spacing.

Reference: "Here's a New Method of Calculating Recovery of Light Hydrocarbons by Gas Cycling Semidepleted Dark Oil Sands," by C. N. Simm, California Research Corp., San Francisco, The Oil and Gas Journal, December 7, 1953, page 104.

6 New Oil-Well Evaluation Method Quickly Tells Lease Values . . . A new oil-well evaluation nomograph is used to determine the net income on a per well basis for an oil reservoir, at various depths. With a gradual trend toward deeper and deeper drilling, questions as to payout on deep wells are becoming increasingly important, and charts can be used for computations on this factor. Data relating productive oil sand and well spacing also are two important variables which can be obtained from the charts.

Reference: "How to Use the Oil-Well Evaluation Nomograph" (with insert-type foldout charts), by Howard K. Grant, Western Gulf Oil Co., Los Angeles, The Oil and Gas Journal, October 5, 1953, page 209.

7 How Does Oil Occur in Formations, and How Is It Displaced? . . . If one were to assume that research directed toward oil recovery would lead to economically feasible procedures or methods to double the yield from United States oil fields—the increase in established reserves would be 28 billion barrels, and recovery processes are predicated on fluid flow. In oil-water displacement processes in essentially regular and uniform flow beds, four characteristic microscopic flow structures have been found so far; these are described.

Reference: "Mechanism of Displacement of Oil From Porous Materials," by Dr. Morris Muskat, Gulf Oil Corp., Pittsburgh, and Dr. Alfred Chatenever, University of Oklahoma, Norman, The Oil and Gas Journal, November 16, 1953, page 238.

8 How Atlantic Refining Is Field Testing "Water Imbibition" in Spraberry . . . Atlantic is using new water imbibition secondary-recovery process in the upper Spraberry formation under its W. M. Schrock lease in Driver field of Glasscock County. The pilot project is expected to answer the question of whether field application of the new water-imbibition technique will provide results as satisfactory as those obtained in the laboratory.

Reference: "New Process Under Test in Spraberry Water Imbibition Pilot Project," by Roy F. Carlson, West Texas district editor, The Oil and Gas Journal, January 12, 1953, page 67 (also see Journal issue of November 17, 1952, page 264).

9 Oil's New Engineering Robots: Advanced High-Speed Business Machines . . . New engineering robots are revolutionizing tedious and time-consuming computations in all phases of the oil industry. The Oil and Gas Journal, in eight articles appearing in a special section, covered:

1. "How Humble Uses Electronic Computers."

2. "A Petroleum-Engineering File—On Punched Cards," by R. K. Guthrie et al., Seeligson Engineering Committee, San Antonio.

3. "Computation of Sand Volumes From Isopach Maps (Using punched cards instead of a planimeter)," by R. K. Guthrie et al., Seeligson Engineering Committee, San Antonio.

4. "Allocating Battery Oil and Gas Production to Individual Wells (Using punched-card computing system)," by J. W. Amyx et al., Seeligson Engineering Committee, San Antonio.

5. "Calculation of Crude-Oil Run Tickets—By Electronics," by H. M. Spinning, Shell Oil Co., Midland, Tex.

6. "Computing Gas Volumes From Orifice-Meter Charts Integrator Data (Using a punched-card system)," by A. C. Buchanan, Jr., and Hubert Skinner, Magnolia Petroleum Co., Dallas.

7. "Digital Computation of Resistivity-Departure Curve," by Dr. Leendert de Witte, Continental Oil Co., Ponca City, Okla.

8. "Mechanized Accounting Aids Major Drilling Contractor," by Joseph A. Kornfeld, Mid-Continent district editor, The Oil and Gas Journal, Tulsa.

Reference: Special section, "New Business Machines for Oil," The Oil and Gas Journal, February 2, 1953, pages 57-76.

10 "Push Button" Operation for Gross Fluid Production, Percentage Water Cut, and Wet-Gas Output (Automatically Recorded) on Individual Wells" . . Completely automatic testing of individual wells is being accomplished by Shell Oil Co. at three trap farms in Brea-Olinda field near Los Angeles. At each installation wells are automatically diverted from a bulk manifold to test traps, where the oil and gas output is separated, metered, and recorded. Frequency and sequence in which wells are switched are preset on well switches.

Reference: "Shell's Push-Button Trap Farm," by D. H. Stormont, West Coast district editor, The Oil and Gas Journal, October 12, 1953, page 148.

11 Automatic Oil Field (Automatic Gaging and Controlling Operations) . . . Automatic equipment can be obtained to take care of these important functions on producing wells: (1) start and stop production from wells; (2) measure the quantities of oil, gas, and water from each well and all wells on given property; (3) shut in well or wells whenever equipment fails; and (4) obtain records of individual production rates, total production rates, and oil and gas delivered or sold. In most cases the devices used have clearly demonstrated they can do a good job on these production activities.

Reference: "25 Ways to Automatically Gage and Control Oil-Field Producing Operations," by Robert L. Beckwith, Standard Oil Co. of California, San Francisco, The Oil and Gas Journal, July 20, 1953, (special section, pages 90-99).

12 New Compilation of Drilling-Producing-Refining Regulations. There are hundreds, if not thousands, of rules and regulations applicable to conducting of oil operations in the southwestern states.

The Journal has prepared a simplified series on this subject:

1. "Drilling-Producing Regulations of Texas Railroad Commission," November 24, 1952, page 94.
2. "Gas-Well Potentials and Gas Allowables," (Tex. R. R. Comm.), January 12, 1953, page 93.
3. "Pipe-Line Movement of Crude Oil," (Tex. R. R. Comm.), January 19, 1953, page 110.
4. "Refineries and Natural-Gasoline Plants," (Tex. R. R. Comm.), February 9, 1953, page 121.
5. "Plants—Pressure Maintenance, Cycling, Reclaiming, Carbon Black," (Tex. R. R. Comm.), February 16, 1953, page 120.
6. "How the New Mexico Oil and Gas Engineering Committee Performs Its Functions," June 29, 1953, page 81.
7. "Here's How to Conduct Oil Business in Louisiana," September 14, 1953, page 102.
8. "It's Easy to Do Oil Business in Arkansas," September 28, 1953, page 98.

Over 2½ million gallons per day of raw and deethanized liquids from widely scattered natural-gasoline plants go to these central superfractionator facilities located near Borger, Tex., and operated by the natural-gasoline department of Phillips Petroleum Co.

DEVELOPMENTS OF THE YEAR

NATURAL GASOLINE in '53

. . . as the Journal followed its progress

AN increase of 11.2 per cent in sales of L.P.G. over 1952, for domestic use and as fuel for internal-combustion engines, was reported by G. R. Benz and P. W. Tucker of Phillips Petroleum Co. *(The Oil and Gas Journal, January 4, 1954, page 46)*. L.P.G. sales for 1953 reached a new record of 2,932,000,000 gal. for these uses. Total sales reached almost 5 billion gallons, up 10 per cent over 1952. Developments in the industrial use of L.P.G. include experiments of Union Pacific with an L.P.G.-fired turbine locomotive. *(The Oil and Gas Journal, December 14, 1953, page 95)*. A big development of 1953 for L.P.G. was the sharp gain of 16.6 per cent in volume used for making petrochemicals, estimated sales for this purpose being 1,016,000,000 gal. in 1953. An estimated production capacity increase of some 550,000,000 gal. with addition of 15 new natural-gasoline plants, including the large National Petro-Chemicals Corp. plant at Tuscola, Ill., was reported. It is estimated that present underground-storage facilities include 67 completed projects with capacity of over 205,000,000 gal. Another 76 projects with capacity of over 235,000,000 gal. are under construction or planned.

1 Rapid Methods of Costimating for Gasoline and Cycling-Plant Projects . . . Two short-cut methods for making preliminary estimates of costs on natural-gasoline and cycling-plant projects were given in this comprehensive article by Stanolind Oil & Gas Co. engineers. One short-cut method utilizes a correlation of total plant cost with the primary variables of (1) type of plant, (2) volume of gas processed daily, and (3) per cent of propane recovery. The second method consists of a series of correlations which permit estimate of gasoline or cycling-plant cost in about an hour. Data on three installed plants indicate method is accurate within 2 to 15 per cent.

Reference: "A Short Cut to Gasoline and Cycling-Plant Costs," by E. W. Kilgren and C. S. Miller, Jr., Stanolind Oil & Gas Co., Tulsa, The Oil and Gas Journal, April 27, 1953, page 144.

2 East Vealmoor Gasoline Plant Processes Gas From Five Fields . . . The East Vealmoor plant in Howard County, Texas, is owned by Reef Fields Gasoline Corp. and Skelly Oil Co. Some unusual features of the plant are: (1) a gas-gathering system extending some 30 miles, end to end, and handling all casing-head gas produced in five fields, (2) extraction of 291,000 gal. of products per day while using less than 90 g.p.m. of makeup water, (3) the recovery of 94 per cent of propane without reabsorbers or recompressors, (4) utilization of fuel-gas pressure reduction to gas-turbine drive all lean-oil pumps, and (5) washing out of underground storage with waste water originally produced from water wells 40 miles away.

Reference: "Five-Field Natural Gasoline Plant," by M. R. Lents and W. S. Hudson, Reef Fields Gasoline Corp., Houston, The Oil and Gas Journal, October 19, 1953, page 104.

3 Field Processing Page Features C.R.C. Absorber Method . . . An accurate method, developed by California Research Corp., for the calculation of component yields and temperature conditions in absorbers, is the first series to be run in a new Journal feature, the Field Processing page in the Engineering Reference Section. The new C.R.C. method is supported by a large amount of operating data covering wide ranges of pressure, temperature, lean-oil molecular weight, gas composition, and absorption factor.

Reference: "How to Design and Evaluate Absorbers," by R. J. Hull and K. Raymond, California Research Corp., La Habra, Calif. Continuing series in The Oil and Gas Journal, beginning with issue of November 9, 1953, page 163.

4 Propane Storage in Mined Cavern and Batching in Products Line . . . Transportation of propane in Phillips Pipe Line Co. Borger, Tex., to East Chicago, Ind., products line was reported at the annual A.P.I. meeting in 1953. Tenders ranged from 25,000 to 55,000 bbl. Pumping equipment consists of conventional centrifugal pumps with mechanical seals. Station back pressures must be watched closely to keep propane in liquid state. Storage facilities include (1) conventional aboveground, (2) underground pipe storage, and (3) mined underground cavern of about 285,000-bbl. capacity. This cavern is equipped with float-type gage read at ground level. Cavern temperatures are determined with thermocouples.

Reference: "How to Transport and Store Propane on a Products Pipe-Line System," by J. W. Boyd, J. O. Richardson, and D. A. Roach, Phillips Pipe Line Co., Bartlesville, Okla., The Oil and Gas Journal, November 16, 1953, page 220.

5 L.P.G. Underground-Projected Capacity, N.G.A.A. Standards, Costs . . . Rapid growth of L.P.G. demand has led to development of underground storage amounting to more than 3,000,000 bbl. in use during 1953. Total projected cavity storage in use or planned by 1954 totals approximately 8,500,000 bbl. Comparison is given for a plant with and without underground storage, including tables showing plant revenue.

Reference: "Underground Storage . . .," by H. R. Thomas, Stanolind Oil & Gas Co., Tulsa, The Oil and Gas Journal, June 1, 1953, page 95. "N.G.A.A. Tentative Standards . . .," The Oil and Gas Journal, April 27, 1953, page 191. "How to Install Subsurface Storage Facilities for L.P.G.," by N. E. Van Fossan, Slick-Urschel Oil Co., Midland, Tex., The Oil and Gas Journal, April 27, 1953, page 192.

6 Butane and Propane Storage by Dual Injection . . . La Gloria Corp. in cooperation with La Gloria Unit operators has been operating a storage project for propane and butane in partially depleted gas sands using a dually completed gas well for storage-withdrawal service. Results of two cycles of storage and recovery were reported, showing essentially 100 per cent recovery factor for the first season of 1950-51 and high recovery for the second season of 1952-53, this latter being expected to increase as additional product was recovered.

Reference: "Dual Injection of Butane and Propane . . .," by J. A. Kornfeld, district editor, The Oil and Gas Journal, April 27, 1953, page 185.

7 Late Equipment Features Incorporated in Ringwood Plant Design . . . Some of the newer industry developments in processing equipment employed in Warren Petroleum Corp. operated Ringwood, Okla., plant include: (1) combination hydraulic power-pumping unit, (2) a single drive for both vapor recompression and high-pressure lean-oil pump, (3) use of reabsorber base cooler to improve reabsorber efficiency, (4) hydrocarbon stripping (dry distillation), and (5) extensive use of aerial coolers. The hydraulic motor-pump unit is employed on the pressure letdown at the point where the 750-psig. rich-oil stream from the main absorber is reduced in pressure to 250 psig. (vent-tank pressure) for the first rich-oil flash.

Reference: "Five New Developments Incorporated in Design of Ringwood Plant," by B. J. Thompson, Warren Petroleum Corp., Tulsa, The Oil and Gas Journal, April 27, 1953, page 161.

8 Over 2,500,000 Gal. Daily Charged to Borger Fractionator . . . The superfractionator facilities located near Borger, Tex., and operated by the natural-gasoline department of Phillips Petroleum Co. are unique in the size of the installation employed to separate some 2½ million gallons daily of deethanized and raw natural-gasoline liquids into paraffin fractions from propane down through isooctane, as well as various naphthenic fractions.

Reference: "Raw-Liquids Gathering System, Largest Superfractionation Plant . . .," by J. C. Reidel, district editor, The Oil and Gas Journal, April 27, 1953, page 168.

9 How to Minimize Corrosion in MEA and Glycol Gas Processing . . . Most effective way to prevent stress corrosion cracking in water-amine gas-treating equipment was found to be in stress relieving of new equipment and after welding has been done on old equipment. Additional preventive measures can be taken in MEA treating of gas for removal of acidic constituents by way of modifying the process: (1) lower kettle temperature, (2) blanket surge tanks, and (3) use amine reclaimers. In the case of glycol dehydration, Southern Counties Gas Co. has incorporated a vent-decanter tank to degasify and purify the glycol. Liquid velocities have been reduced and filters installed. Glycol-to-glycol heat exchangers are used to reduce heat requirements. Inhibitors are used. Elevated stainless-steel rectifiers are also employed.

Reference: "What to Do About Amine Stress Corrosion," by G. L. Garwood, Phillips Petroleum Co., Bartlesville, Okla., The Oil and Gas Journal, July 27, 1953, page 334. "How to Mitigate Corrosion in a Glycol-Dehydration Plant," by N. K. Senatoroff, Southern Counties Gas Co., The Oil and Gas Journal, April 27, 1953, page 154.

10 Elk City, Okla., Cycling Plant in Second Expansion . . . When the present extension of the Elk City, Okla., plant, operated by Shell Oil Co., is completed, process capacity will be raised to 225,000 M.c.f.d. This is a multipurpose field processing plant combining the functions of crude stabilization, liquids extraction, and pressure maintenance. Presently six new 1,760-hp. compressors are being installed, as well as a new absorption column and new fractionator. At completion of this latest expansion in the spring of 1954, output of natural gasoline, butane, and propane will be increased 50 per cent. Gas-injection capacity will be raised from 135,000 to about 210,000 M.c.f.d. The plant at present handles a 300-psi. and a 1,000-psi (well effluent) gas stream and injects dry gas back into the producing Hoxbar reservoir.

Reference: "Pressure Maintenance, Liquids Extraction, and Crude Stabilization at Elk City . . .," The Oil and Gas Journal, May 2, 1953, page 214.

11 Highest-Pressure Desulfurization Is Feature of McKamie Pool Plant . . . The plant operated by the McKamie Gas Cleaning Co. is located in Lafayette County, Arkansas. This is adjacent to the unitized McKamie-Patton pool. The plant's functions are: (1) gas and liquid sweetening, (2) distillate stabilization, (3) natural gasoline and L.P.G. extraction, and (4) gas dehydration and injection. The McKamie plant furnishes an acid-gas stream to the adjacent Mathieson Chemical Corp. plant for sulfur conversion. One unusual feature is the high-pressure gas-desulfurization section which operates at above 1,400 psi.

Reference: New McKamie Processing Facilities Operating at 50 Million Cubic Feet Daily," by K. G. Pearce, McKamie Gas Cleaning Co., Magnolia, Ark., The Oil and Gas Journal, May 25, 1953, page 152.

12 Two Plants Operate With Common Deethanizer . . . Stanolind Oil & Gas Co.'s largest natural-gasoline plant is located at Ulysses, Kans., and now has a gas-processing capacity of 325,000 M.c.f.d. in winter operation. Total gas load is split between the original plant and the adjacent new Stano plant addition. The deethanizer of the new plant handles the still-top product and recompression condensate from both plants.

Reference: "Ulysses Plant Now Stanolind's Largest," by J. C. Reidel, district editor, The Oil and Gas Journal, May 25, 1953, page 156.

MACKINAC STRAITS CROSSING of Lakehead Pipe Line is deepest, perhaps most difficult yet completed.

DEVELOPMENTS OF THE YEAR

PIPE LINING in '53 . . .

as the advances were recorded in the Journal

PIPE-LINE DEVELOPMENTS in 1953 give evidence to the continuing trend toward big and bigger-inch lines for crude, gas, and product transport; installation of remote-controlled automatic stations and other equipment is now becoming commonplace; technological developments and better engineering practices are adding to pipe-line economy.

Topping the list for big crude lines is Lakehead Pipe Line Co.'s 30-in. extending from Superior, Wis., to Sarnia, Ont.; it is the largest-diameter crude line in this country. Other majors were the Rancho Pipe Line System 24-in. line from McCamey, Tex., to Houston, the West Texas-Gulf 26-in. from Colorado City to Beaumont and Sinclair Pipe Line Co.'s 22 and 24-in. from Oklahoma to Chicago. Typical of gas-line construction were the 30-in. line being laid from Louisiana to Kentucky for Gulf Interstate Co. and El Paso Natural Gas Co.'s 30-in. from Texas to California. Product lines in the big-inch class included the Evangeline line from Baton Rouge, La., to Port Arthur, Tex.

Automatic pipe-line stations, proved successful, are being operated by several companies and considered by many. Microwave, after a shaky incubation period, is now considered reliable and inexpensive. Throughout the industry a swing toward better engineering design and more efficient operation is indicated.

1 Mackinac Straits Crossing Is World's Deepest . . . Two 20-in. lines laid across Mackinac Straits for Lakehead Pipeline Co. make up the world's deepest pipe-line water crossing and are a vital link in a 30-in. crude line. Preparatory work included current measurements at all depths, bottom-soil samples, and grade work to give minimum curvature of pipe. The ⅞-in.-wall pipe, highly ductile and requiring no ballast, was pulled "on bottom" by cable and stem winch; self-releasing pontoons reduced negative buoyancy. The filling method allowed deepest part of line to settle into final position first while tension was slowly released on remainder. Pull on pipe and bottom location of pipe were determinable at all times.

Reference: "Mackinac Straits Crossing Is 1953's Most Challenging," by Paul Reed, The Oil and Gas Journal, September 21, 1953, page 168.

2 Sizing Tank and Delivery Lines for Products Terminals . . . Use of a modified version of the Hazen-Williams formula results in an equation wherein the only unknown is throughput if pressure, pipe size, and product are held constant. By use of curves (prepared for gasoline but convertible to other products) a rapid, accurate determination of pipe size or throughput for a given size may be made. Size of delivery line and tank lines may be found in one operation. Drop across fittings may be accounted for if desired.

Reference: "How to Size Tank-Farm and Delivery Lines," Edwin A. Birge, Plantation Pipe Line Co., The Oil and Gas Journal, September 21, 1953, page 178, and November 2, 1953, page 121, errata.

3 Vapor Loss Cut 83 Per Cent by Microballoons . . . An average saving of 83 per cent on vapor loss from static or working tanks may be achieved by installing a ½-in. seal of plastic microballoons. These balloons, averaging 19 μ in size, are pumped in with oil and form a fluid, floating seal on the surface. Installed cost in a 55,000-bbl. tank is about $2,600; payout should be within 1 year. Fire hazard is greatly reduced and gaging operations are affected only slightly. Tests indicate the seal should be effective far beyond required economic life.

The fluidity of the layer enables it to pass around supports, swing lines, and other "dead wood" in the tank, keeping surface sealed as level varies.

Reference: "New Foam Cuts Evaporation Loss," by E. G. Ellerbrake, Sohio Pipe Line Co., and F. Veatch, Standard Oil Co. (Ohio), The Oil and Gas Journal, November 16, 1953, page 223.

4 Pipe-Line Size for Minimum Investment . . . The economical line size for a given flow rate may be determined in terms of stream properties and power-to-pipe investment ratio by using nomograms. Total investment is equated to sum of all investment factors expressed on a per inch diameter basis. Minimizing this equation by first derivative methods will give an expression for diameter to make investment a minimum. Nomograms aid in solving for actual value of diameter. D'Arcy-Weisbach and T. R. Aude hydraulic equations are used. Fixed operational costs may be included.

Reference: "Selecting Pipe-Line Diameter for Minimum Investment," by George F. Downs, Jr., and George R. Tait, Phillips Petroleum Co., The Oil and Gas Journal, November 16, 1953, page 210.

5 New Big-Inch Crude Lines in Operation . . . West Texas-Gulf Pipe Line Co.'s 465-mile, 26-in. line, having this country's highest capacity of 301,000 bbl. per day, extends from Colorado City, Tex., to the coast near Beaumont; a 112-mile, 20-in. spur from Wortham connects to the Mid-Valley System at Longview.

The Platte Pipe Line Co.'s 20-in., 932-mile line from Casper, Wyo., to Wood River, Ill., serves as a much-needed outlet for Rocky Mountain crude and will stimulate exploration and production in this area. Present capacity is 110,000 bbl. per day.

References: "Biggest-Capacity Crude Line," by Paul Reed, The Oil and Gas Journal, May 11, 1953, page 107. "Platte Line Dedicated," by Gerald L. Farrar, The Oil and Gas Journal, August 10, 1953, page 72.

6 Economic Design of Cathodic Protection Systems . . . Cable for rectifier installations should be sized to conform with Kelvin's economic law which states that proper size cable will make the sum of operating and fixed costs a minimum. Proper size may be determined by plotting curves from equation given.

Engineers frequently overlook one or more of the basic factors of design for current-carrying rectifiers in pipe-line cathodic protection systems. Result is a system that is not as economical in operation as it should be.

In placing protection on lines in high-restivity soil, Southeastern Pipe Line Co. found it economical to drill 40 ft. or more to reach low-resistivity soil; the saving in anode cost alone paid for extra drilling.

Reference: "Mitigation of Pipe-Line Corrosion," by Gerald L. Farrar, The Oil and Gas Journal, April 20, 1953, page 148.

7 Microwave Communication for Platte Pipe Line . . . A 44-station, 6,700-mc. microwave system provides communication and control for this 932-mile crude line. Nine channels are used for voice, supervisory control, teletype, service and V.H.F. control; extra channels are available. Reliability is assured by a designed fade margin of 30 db. per link and the use of auxiliary power-generating equipment and standby radio-frequency sections. Line and terminal information is continually telemetered to Kansas City where operators have push-button control of the pipe-line system. The dual frequency V.H.F. system allows mobile-to-mobile or mobile-to-land station communication over the entire line.

Reference: "Platte Pipe-Line Communication and Control Systems," by Morton L. Long, Philco Corp., The Oil and Gas Journal, April 6, 1953, page 91.

8 Remote-Controlled Pump Stations Prove Successful . . . Plantation Pipe Line Co. is considering unattended, remote-controlled stations for its main lines after four small stations have proved satisfactory. These stations were designed "fail safe" in every respect; electrical, mechanical, or hydraulic failure causes a station to shut down and lock out automatically. Remote control is by microwave and by leased wire; both methods have been reliable. When line scraping is necessary an automatic detector system shuts down and restarts a station in a minimum amount of time as the scraper passes.

Reference: "Performance of Unattended Pipe-Line Stations," by R. S. Cannon and T. V. Bockman, Plantation Pipe Line Co., The Oil and Gas Journal, December 7, 1953, page 101.

9 Operational Report on Pipe-Line Centrifugal Compressor . . . After 2 years' operational experience with an 1,850-hp. gas-turbine centrifugal compressor, Mississippi River Fuel Corp. finds that the equipment is flexible, in that no instability is noticed over a wide range of flow rates, and its efficiency during normal flow is about 14.5 per cent. Satisfactory turbine operation on either gas or fuel oil is reported. Suggested changes to make the equipment more dependable are included. A method is given for determining horsepower and efficiency from field data.

This is the pioneer centrifugal compressor installation on a pipe line, employing a simple-cycle system.

Reference: "First Pipe-Line Centrifugal Compressor," by G. Carl Cooper, Jr., Mississippi River Fuel Corp., The Oil and Gas Journal, July 13, 1953, page 131.

10 El Paso Natural Lays New Line to California . . . An additional supply of 300 M.M.c.f. per day of gas will be available in California with the completion of El Paso Natural's 30-in. line from Plains, Tex., to Kingman, Ariz., where a tie-in will be made with three California systems. Through arrangements with Northern Natural, gas from the Spraberry Trend area will be taken for delivery in California and El Paso will in turn supply Northern Natural with an equal amount from fields in Panhandle area for delivery to North and Midwest markets. An important result will be the return to full production in the Spraberry area of West Texas.

Reference: "Spraberry to Resume Full Production," by Robert J. Enright, The Oil and Gas Journal, December 28, 1953, page 50.

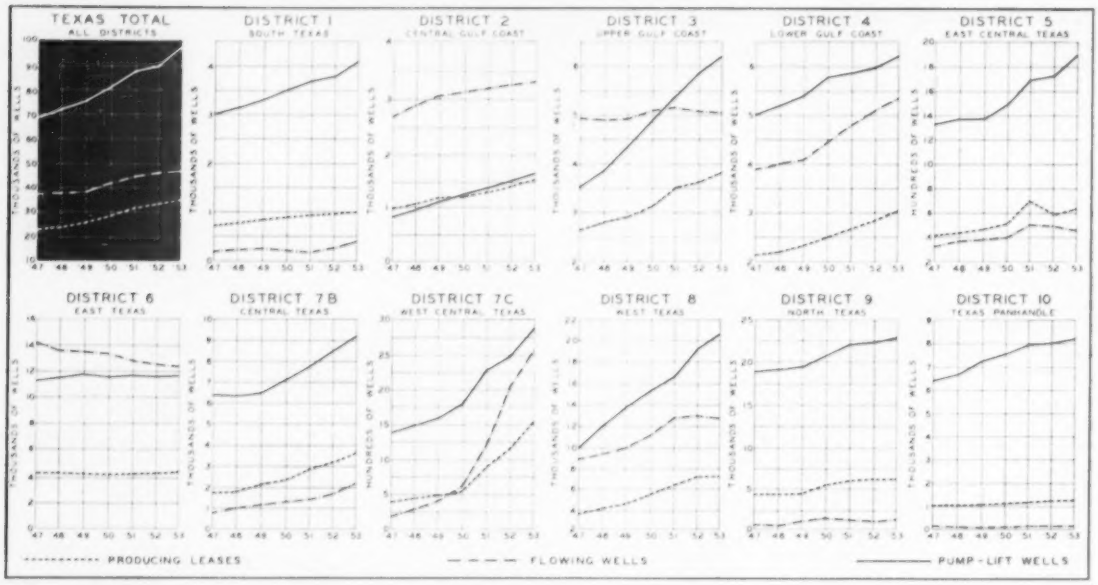
11 Big Gas Line Being Constructed by Gulf Interstate . . . The major portion of pipe laying on Gulf Interstate Gas Co.'s 860-mile-gas-transmission system from southern Louisiana to northeastern Kentucky has been completed. All river crossings are in the final stages of completion, and work is well advanced on more than 200 miles of gathering lines in Louisiana. Work has started on five compressor stations.

The entire $130,000,000 project is due for completion by November. System will be capable of delivering 375,000,000 cu. ft. of gas daily to United Gas Co.'s system near Kenova, W. Va.

Reference: "Gulf Interstate Nears Halfway Mark on 860-Mile Big-Inch Line," The Oil and Gas Journal, November 30, page 50.

12 How Remote-Controlled Booster Stations Are Operated . . . The National Cooperative Refinery Association products pipe-line system, running from McPherson, Kans., to terminals in Council Bluffs, Iowa, and Irvington, Neb., provides a good example of remote control of booster stations. Operation is controlled by sending dial signals from McPherson. These signals comprise a motor start-and-stop code, telemetering code, and lockout alarm indicator code. Instrument diagrams of the booster stations show how pneumatic-pressure pilot controllers are employed to control, suction, and discharge pressure of these stations.

Reference: "N.C.R.A. Products Line Now Automatic," by L. N. Young, National Cooperative Refinery Association, McPherson, Kans., The Oil and Gas Journal, September 21, 1953, page 288. "Here's How N.C.R.A. Operates Remote-Controlled Boosters," by L. N. Young, The Oil and Gas Journal, October 5, 1953, page 286.



ARTIFICIAL LIFT in '54

. . . Journal sees 23,374 wells as pumpers

by Joseph A. Kornfeld

FOR the year 1954 The Oil and Gas Journal estimates that 23,374 wells will be placed on artificial lift. This number is down slightly from last year's record.

Texas . . . About 35 per cent of these units will be installed in Texas which leads the nation with 8,276 wells to be placed on artificial-lift and pumping-well schedules. More than half of the Texas units will be installed in north and west sectors of the state.

The chart on this page shows the 7-year trend ending in 1953 as to number of producing leases, number of flowing wells, and number of pump-lift wells for Texas; these data summarize the entire state (black background) as well as individual Railroad Commission official districts.

Mid-Continent . . . Oklahoma ranks second in the number of new oil wells to be placed on artificial lift, and it is estimated that 4,491 units will be installed in that state during 1954. Kansas will have 2,138 pumping-unit installations, principally in Ordovician Arbuckle limestone completions.

Rocky Mountain province . . . More than 1,100 new pumping units will be installed in the fields on the plains and in the intermontane basins of the Rocky Mountain province. Predominant in this province is Wyoming which will need 536 new units. Colorado is next with 238 pumping units to be installed mainly on the discovery wells and extensions in the Denver-Julesburg basin, while operations on the Nebraska side of this basin will take 123 units during 1954. Some units will go into the Uinta basin.

Most of Montana's new oil-well completions will go on the pump with the exception of new development on faulted structures located on the Cedar Creek anticline in the eastern part of the state.

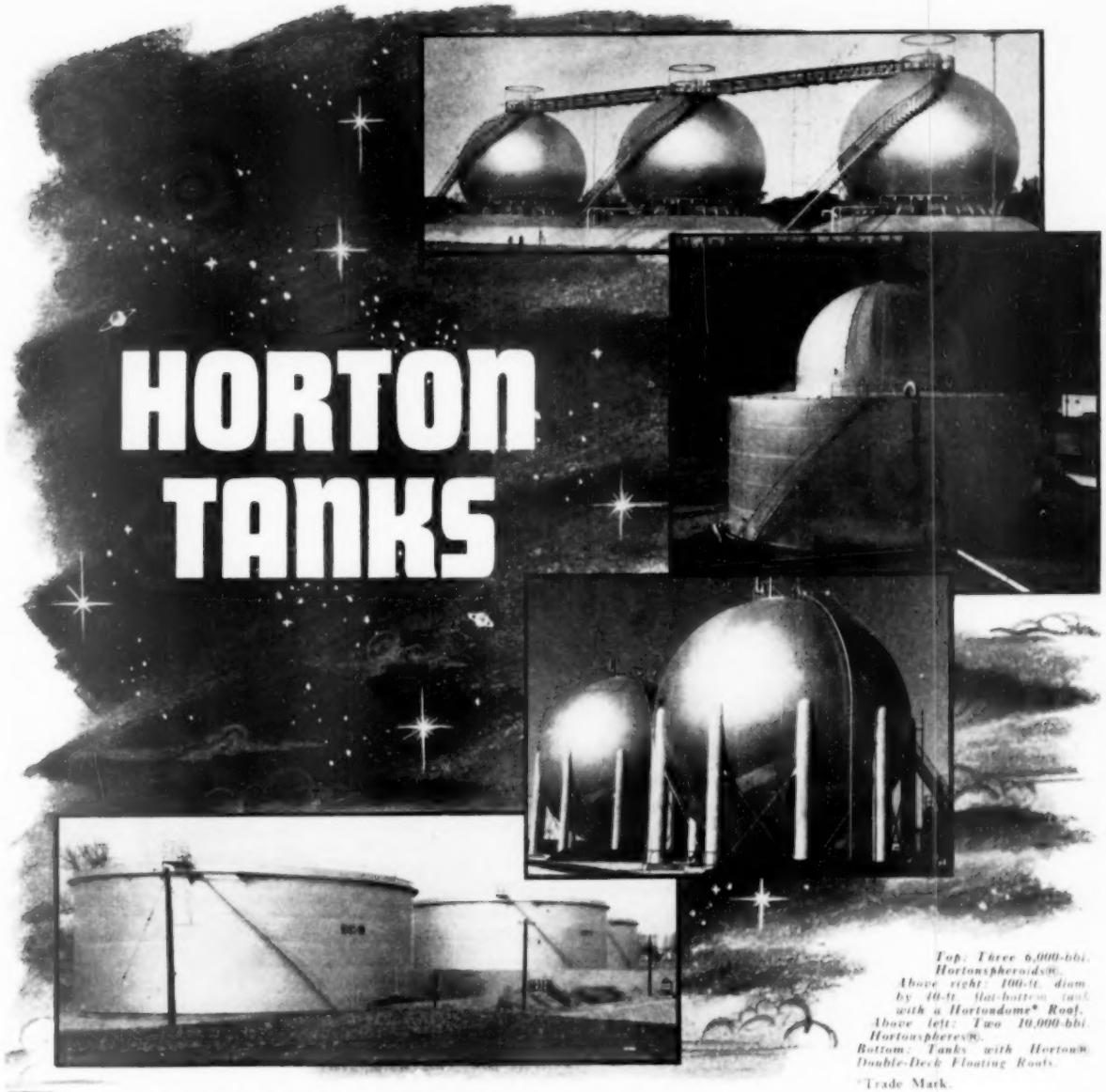
Secondary recovery . . . About one-seventh of the total number of new pumping units in the United States during 1954 will be installed in the Illinois basin and the Appalachian fields. Secondary-recovery methods for increasing oil-production rates and ultimate recoveries is becoming more widespread in these older, shallow producing areas. Popularity of the five-spot injection well pattern calls for conversion or drilling of one pumping oil well for every injection well drilled.

Illinois basin requirements for primary and secondary-recovery operations for 1954 total 1,993 new units. Illinois needs are figured at 1,181, Indiana 420, and Kentucky 392.

Appalachian field requirements total 1,362 new pumping units of which Pennsylvania will need 501, Ohio 485, New York 301, and West Virginia 75.

ARTIFICIAL LIFT SURVEY, 1954

State—	Est. for '54— To be drilled	Artificial lift
Arkansas	527	150
California	2,487	1,816
Colorado	737	238
Illinois	2,147	1,181
Indiana	1,201	420
Kansas	4,688	2,138
Kentucky	1,154	392
Louisiana	3,044	1,128
Michigan	627	309
Mississippi	410	58
Montana	433	195
Nebraska	293	123
New Mexico	1,353	389
New York	691	301
Ohio	1,103	485
Oklahoma	7,485	4,491
Pennsylvania	1,193	501
Texas	16,859	8,276
West Virginia	628	75
Wyoming	913	536
Others	527	172
Total U. S.	48,410	23,374



Top: Three 6,000-bbl. Hortonspheroids®. Above right: 100-ft. diam. by 40-ft. flat-bottom tank with a Hortondome Roof. Above left: Two 10,000-bbl. Hortonspheres®. Bottom: Tanks with Horton® Double-Deck Floating Roofs.*

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Los Angeles, 17 ..... 1523 General Petroleum Bldg.
New York, 6 ..... 3347—165 Broadway Bldg.
Philadelphia, 3 ..... 1615—1700 Walnut Street Bldg.
Pittsburgh, 19 ..... 3228 Alcoa Bldg.
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Seattle, 1 ..... 1325 Henry Bldg.
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PLATFORMER OPERATION at the Big Spring refinery of Cosden Petroleum Corp. is typical of much of the new catalytic reforming capacity now installed or being installed.

DEVELOPMENTS OF THE YEAR

REFINING in '53 ... *as reported*

in a dozen outstanding Journal articles

DURING 1953, refiners faced a problem of increasing severity—that of what to do about the residual-fuel situation. Dieselization of railroads and demands for cleaner and lighter fuels caused a continuation of the diminishing market trend established in early postwar years.

Result is that it seems imperative that the average refiner reduce his residual-fuel yield to 10 per cent or less, based on crude charge. A great deal of attention has been focused on the three most prominent methods for reducing heavy fuel output: (1) vacuum distillation, (2) coking, and (3) solvent decarbonizing.

Greatest developments during the year came in the coking field. Two new continuous coking processes were developed and declared ready for commercial application (See Nos. 2 and 3 accompanying).

The year 1953 also saw plans made and contracts let to more than triple the United States catalytic reforming capacity (see No. 4 accompanying). On contract are 51 more units, rated capacity of which is 435,000 bbl. per day. Major oil companies definitely entered the cat reforming field for the first time in 1953 by scheduling more than half of the new capacity.

1 Preparation of Feed Stock for Catalytic cracking units . . . Feed-stock preparation must be given careful consideration by refiners who are interested in either increasing existing catalytic cracker capacity erecting new cracking facilities, or reducing yields of residual fuel oil. Vacuum flashing, coking, and solvent decarbonizing are among the most important commercial processes. Local conditions, existing refining equipment, and physical characteristics of the crude must be considered in making proper selection. For example, high-asphalt-content crudes might best be handled by solvent decarbonizing. Where product fuel oil viscosity is important, coking may be more attractive.

Reference: "Economic Evaluation of Vacuum Flashing, Delayed Coking, and Solvent Decarbonizing," by N. R. Adams and W. J. Price, The M. W. Kellogg Co., New York; The Oil and Gas Journal, March 23, 1953, page 300.

2 Continuous-Coking Process Shows Ability to Handle Heavy Feed Stocks . . . Results from first commercial continuous contact-coking process show that: (1) heavier residues than those normally handled by the conventional delayed coking method can be upgraded; (2) flexibility of the process permits processing stocks of widely different characteristics to obtain wider ranges of yields and product specifications; (3) need for intermittent cleaning of coke drums is eliminated; (4) product coke is clean, hard, uniform in size, and easily handled and marketed; and (5) capital investment and operating labor for a contact unit are less than for a delayed coking unit.

Reference: "Continuous-Coking Process Shows Ability to Handle Heavy Feed Stocks," by V. Mekler, A. Schutte, and T. T. Whipple, the Lummus Co., New York; The Oil and Gas Journal, November 16, 1953, page 200.

3 Reducing Fuel-Oil Production by Fluid Coking of Residua . . . Fluid coking developed by the Esso Laboratories, is an adaptation of the fluidized-soilds technique to the coking of crude residua and similar low-grade oils. The process employs no catalyst; it depends on a circulating stream of finely divided coke particles to furnish the heat necessary to carry out the coking reaction.

In typical test residuum was converted from fuel value to 80 per cent by volume of gasoline and gas oil and 30 per cent by weight of fuel products. Coke yields were close to Conradson carbon of original feed. Coke particles are fine, but uniformly spherical, easily handled as fluid or dustless solid. Hydrogen and volatile matter content are low.

Reference: "Fluid Coking of Residua," by A. Voorhies, Jr., and H. Z. Martin, Esso Laboratories, Linden, N. J.; The Oil and Gas Journal, November 16, 1953, page 204.

4 Catalytic Reforming Capacity in U. S. Will Triple This Year . . . Record construction program reflects industry-wide acceptance of this process for upgrading straightrun naphthas to high-octane gasoline blending stocks. At the end of 1953, 43 cat reforming units, with total daily charge capacity of nearly 200,000 bbl., were in operation in the United States. At the end of 1954, 51 more, with rated capacity of 435,000 bbl. daily, are expected to be in operation.

Reference: "Cat Reforming Boom Is On," by George Weber, Journal refining editor; The Oil and Gas Journal, December 28, 1953, page 46.

5 New Catalytic Reforming Process Developed by Sinclair . . . Activity in the field of catalytic reforming during the past year is exemplified by the new process developed by Sinclair Research Laboratories. It is one of several developed in the past 2 years.

The Sinclair process is highly efficient, yet quite flexible. The new platinum reforming catalyst has these advantages: (1) a high ratio of paraffin cyclization activity to hydrocracking activity; and (2) an ability to be regenerated with diluted air.

Reference: "New Catalytic Reforming Process," by J. W. Teter, B. T. Borgerson, and L. H. Beckberger, Sinclair Leboratories, Harvey, Ill.; The Oil and Gas Journal, October 12, 1953, page 118.

6 Preignition is Roadblock to Efficient Fuel Utilization . . . Long a problem in aircraft engines, preignition has recently been found to occur in high-compression-ratio automobile engines, and is at present the factor threatening to limit compression ratios. Many "knock" complaints in recent-model engines are actually the result of preignition. Solution to this problem seems to lie in the addition of small amounts of various chemicals to the fuels to reduce glow of engine deposits, thought to be the prime cause of preignition. Various additives reported by several oil and chemical companies seem to be effective.

Reference: "Preignition—Does It Provide Roadblock to Greater Efficiency in Fuel Utilization?" by J. R. Sabina J. J. Mikita and M. H. Campbell, E. I. du Pont de Nemours & Co., Wilmington, Del.; The Oil and Gas Journal, June 29, 1953, page 66.

7 Asphalt Entrainment Control in Vacuum Pipe Stills by Wire Mesh . . . Wire-mesh sections may be used to sharply reduce asphalt entrainment in vacuum pipe stills. These sections consist of layers of fine knitted wire of a metal alloy suitable to stand up under the operating conditions imposed. When vapors containing finely divided liquid mist are passed through these mesh sections, over 99 per cent of the entrained liquid droplets impinge on the wire, coalesce into large drops, and drain from the mesh section.

This symposium concerns an important use of these sections in preventing the entrainment of heavy asphalt with vacuum vapors, and the resultant contamination of vacuum distillate streams. The result: cleaner cat feed stocks, lube stocks, and other product streams.

Refesence: A nine-part symposium developed by Journal staff and appearing in these issues: November 2, 1953, page 82; November 23, 1953, page 94; December 28, 1953, page 70.

8 Multicomponent Distillation — A Condensed Manual . . . The engineer who encounters multicomponent distillation for the first time is overwhelmed by the voluminous amount of seemingly unrelated published material on this subject. The various articles seem to be a conglomeration of refinements and extensions of methods of calculation that are known only to the experts in this field. Far too little attention has been given to the task of evaluating what is available and preparing a comprehensive outline of how best to approach the general problem. This section fulfills just this purpose. After consideration of appropriate fundamentals, various straightforward, shortcut, and algebraic methods of calculation are considered.

Reference: "Here's What You Need to Know About Multicomponent Distillation," by M. Van Winkle, professor of chemical engineering, University of Texas, Austin; The Oil and Gas Journal, March 23, 1953, page 182.

9 Where Are We in Catalytic Cracking Development? . . . (1) Catalytic cracking capacity in the United States now approaches 3,000,000 bbl. per day, or approximately one-third of the crude run. (2) Latest Journal refinery survey shows that some 130 refineries out of a total of 323 have cat cracking facilities. (3) The purely mechanical difficulties which hampered early cat cracking operations have now largely been overcome, and emphasis has shifted toward obtaining optimum performance. A better understanding of how the cat cracker functions is therefore in order. The Journal is running a series of 10 articles on this subject. Major factors involved in fluidized and moving-bed operations, with particular emphasis on operating variables, are being covered thoroughly.

References: "Operating the Cat Cracker," Parts 1, 2, and 3, by J. W. Moorman, consultant, Tulsa; The Oil and Gas Journal, November 2, 1953, page 92; November 9, 1953, page 116; January 4, 1954, page 76.

10 Here Are the Four Steps in Building Refinery Process Units . . . The four necessary steps in building refinery process units are: (1) preparing the job schedule; (2) scheduling the engineering and drafting; (3) scheduling construction; and (4) job-progress reporting. Planning and scheduling refinery process units is an art, but sound basic principles and data can be incorporated to make the schedule an effective tool.

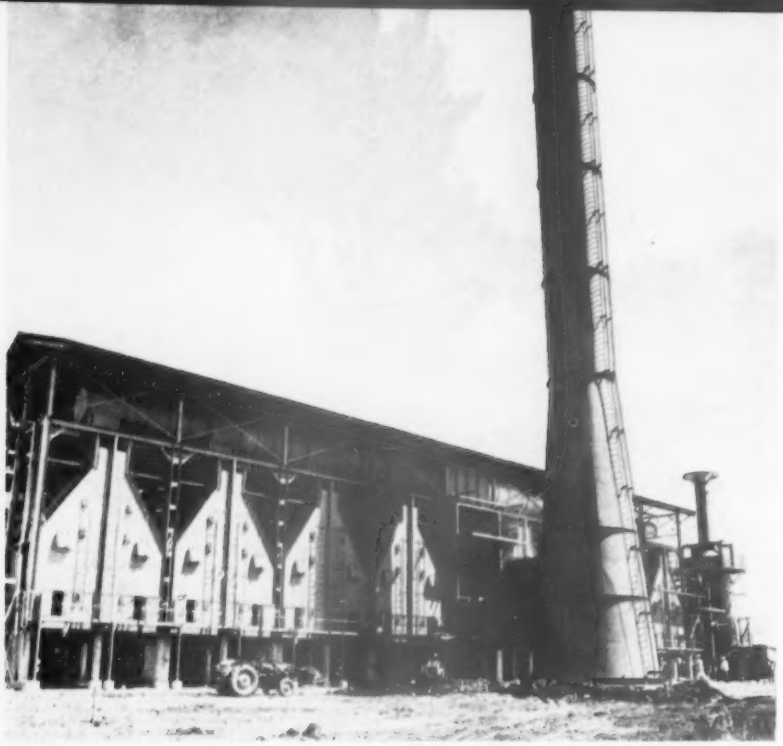
References: "Building Refinery Process Units," Parts 1, 2, 3, and 4, by M. Mattozzi, Arabian American Oil Co., New York; The Oil and Gas Journal, March 23, 1953, page 304; March 30, page 180; April 6, page 100; and April 13, 1953, page 102.

11 How to Combat Erosion in Fluid Catalytic Cracking Units . . . High carbon - high chromium irons offer best resistance to erosion. Chrome-plated steel shows excellent resistance but is not practical construction material. High-alloy steels generally show poor resistance to erosion, as do nonferrous materials. The actual metal loss by erosion is influenced to a marked degree by the angle of impingement, with maximum loss at an angle of about 25°. Erosion increases very rapidly where the catalyst is in dense phase with velocities above 5-7 ft. per second and in lightly loaded gas or vapor lines with velocities above about 120 ft. per second.

Reference: "How to Combat Erosion in Fluid Cat Crackers," by J. S. Clarke, Standard Oil Development Co., New York; The Oil and Gas Journal, March 23, 1953, page 262.

12 Chemical Cleaning of Refining Equipment Is Practical, Economical . . . Chemical cleaning with acid or other suitable solvent to remove surface scale, deposits, and impurities is a safe, useful maintenance tool. With qualified personnel, chemical cleaning is more economical than other maintenance procedures, with jobs paying for themselves within a week or a month. Other advantages: (1) outage time greatly reduced; (2) major equipment dismantling is unnecessary; (3) extra labor and equipment are kept to minimum; and (4) metal loss is inconsequential.

References: "Chemical Cleaning of Refining Equipment," by G. L. Farrar, engineering editor; and "Chemical Cleaning Is a Versatile Tool," by T. N. Griswold and J. O. Thoen, Continental Oil Co., Ponca City, Okla.; The Oil and Gas Journal, March 23, 1953, pages 211 and 236.



This is the world's largest single ethylene unit with a capacity of over 600,000 lb. of ethylene per day. It is a key unit at the Tuscola, Ill., plant of National Petro-Chemicals Corp.

DEVELOPMENTS OF THE YEAR

PETROCHEMICALS in '53

. . . as reported in the Journal's pages

ADDITIONAL large plant capacity was brought into being during 1953 in the petrochemical industry and some new processes were introduced. National Petro-Chemicals Corp. placed on stream a new $50,000,000 petrochemical complex, including a 325-ton per day ethylene unit. Another significant addition was made in ethylene-manufacturing capacity earlier in the year when Gulf Oil Corp. began production from its ethylene plant at Port Arthur, Tex.

New facilities for aromatics production went on stream in 1953. Most recent addition to benzene-toluene-xylene units was Sun Oil Co.'s $15,000,000 aromatics plant.

Activity was heavy during 1953 in construction of ammonia plants with a marked trend toward use of partial oxidation in preparation of synthesis gas. Construction and planning of polyethylene facilities was also strongly emphasized with indications that plants now under construction will boost capacity fourfold to above 500 million pounds per year.

A new process for making acrylonitrile will be introduced when American Cyanamid Co. completes its Fortier plant at Avondale, La., early in 1954. The first commercial unit to synthesize phenol from cumene by the Hercules-Distillers process, was placed in operation by B.A.-Shawinigan, Ltd. at Montreal, Que. Other synthetic phenol plants are under construction.

1 Nearly 30 Billion Pounds of Petrochemicals for 1953 . . . The share of the total chemical market accounted for by current domestic petrochemical production will exceed 25 per cent. Estimated production of chemical intermediates for 1953 shows 18.6 billion pounds or 88 per cent of total aliphatics intermediates to be of petrochemical origin. In aromatics 2.6 billion pounds or 47 per cent is petrochemical. For inorganic chemicals 7.6 billion pounds or 9 per cent is petrochemical.

Reference: "28.9 Billion Pounds of Petrochemicals," by George Weber, refining editor, The Oil and Gas Journal, October 26, 1953, page 56.

2 Survey of Petrochemical Industry, Plants and Products . . . The highly diversified growth of petrochemical operations was emphasized in the first Journal survey of the industry. One company, for example, lists nearly 150 of its chemical products as coming wholly or in part, in commercial quantities, from petroleum or natural gas. A total of 138 companies was listed and 255 operating plants in the United States for manufacture of inorganic chemicals, ammonia, sulfur, and carbon black.

Reference: "Petrochemicals Today," by J. C. Reidel, petrochemical editor, The Oil and Gas Journal, October 26, 1953, page 85.

3 Making Alcohol From Natural Gas at Tuscola, Ill. . . . The National Petro-Chemical Corp. at its new $50,000,000 plant placed in production during 1953 the ethylene, ethanol, and ethyl chloride units as well as the extraction-fractionation plant. Some 400,000,000 cu. ft. of natural gas is fed to the plant to make 125,000 gal. of ethanol daily. The 325-ton per day ethylene plant is the world's largest single unit. Hydrocarbon extraction is obtained by light and heavy-oil absorption. A 95 per cent pure ethane stream is taken off the deethanizer. This is cracked in the bank of eight furnaces to ethylene which is purified and serves as feed stock for making the ethyl alcohol and ethyl chloride.

Ethyl alcohol is manufactured by contacting ethylene with strong sulfuric acid, hydrolysis of the resulting ethyl sulfate and refining of crude alcohol in a series of distillation columns.

Reference: "Natural Gas to Alcohol," The Oil and Gas Journal, November 30, 1953, page 58. See also "Ethyl Alcohol and Ethyl Chloride From Natural Gas," by D. J. Stark, National Petro-Chemicals Corp., Tuscola, Ill., The Oil and Gas Journal, June 1, 1953, page 85.

4 Manufacture of Ethylene Is Big Business . . . Ethylene is regularly

OPERATING COSTS... AND PLANT LOCATION

The ability of a company to make and maintain cost reduction is especially significant now that vigorous competition and a buyers' market are back.

Shrewd selections of plant locations that take advantage of new developments, available manpower, transportation, low-cost power and material handling, can well mean the difference in a healthy profit or a ruinous loss.

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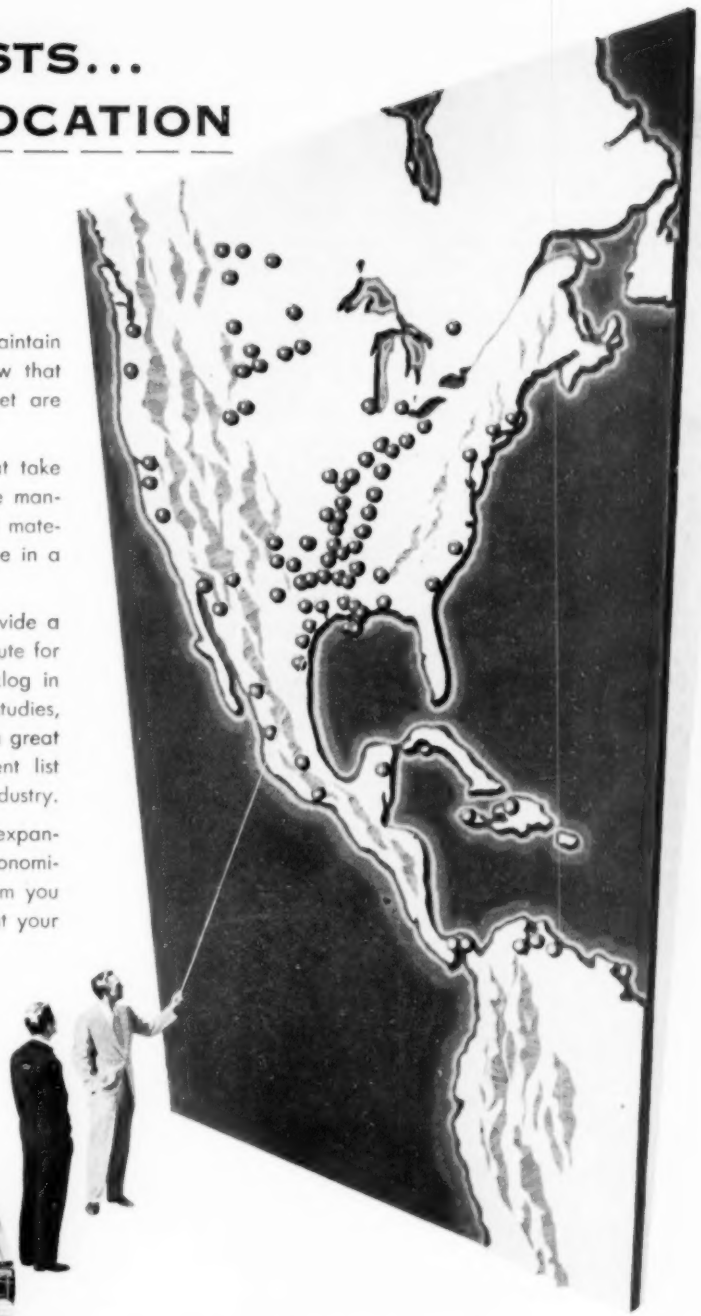

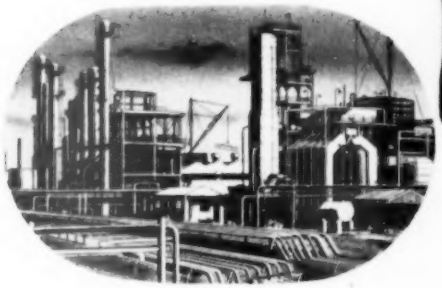

A large part of Brown & Root's activity has centered around the process industries in the design and construction of plants for heavy chemical, petroleum, petro-chemical and organic chemical fields.

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either in first or second place among the large-volume organic chemical intermediates. Ethylene can be obtained: (1) as a byproduct from thermal and catalytic cracking in refinery operations, (2) by thermal cracking of feed stocks such as ethane, (3) through use of a pebble heater or regenerative-type checker furnace, (4) by partial oxidation of ethane, (5) by hydrogenation of acetylene, and (6) from Fischer-Tropsch reaction. Many methods are also available for purification of ethylene.

It may be expected that most economic production of ethylene derivatives might be in plants obtaining feed from a central ethylene producing plant.

Reference: "Ethylene Manufacture Is Big Business," by P. W. Cornell, Gulf Oil Corp., Pittsburgh; The Oil and Gas Journal, August 17, 1953, page 111.

5 **Natural Gas to Acrylonitrile at American Cyanamid Plant . . .** The new Frontier plant of American Cyanamid Co., now under construction at Avondale, La., will make acrylonitrile available in greater quantity to the chemical industry at lower price. The new process utilizes natural gas to make acetylene and ammonia. The ammonia is then reacted with additional methane to yield hydrogen cyanide. The hydrogen cyanide and acetylene are then reacted to form acrylonitrile. Cost of plant will be in the order of $55,000,000 and production of acrylonitrile will be 100,000,000 lb. per year.

Reference: "New Process for Acrylonitrile Will Bring Substantial Cost Reduction," by A. J. Weith, American Cyanamid Co., New York; The Oil and Gas Journal, August 3, 1953, page 78.

6 **Making Synthetic Detergents, p-Xylene . . .** Oronite Chemical Co., subsidiary of Standard Oil Co. of California, is one of the largest producers of raw synthetic detergents, including phthalic anhydride. p-Xylene is also made for Oronite from petroleum base stock by Standard's manufacturing department. Activities center at the Richmond and El Segundo refineries. Mixed xylenes are produced by hydroforming a virgin naphthenic fraction containing C_8 naphthenes, mostly dimethylcyclohexane. Phthalic anhydride is made by oxidation of o-xylene. p-Xylene is separated by fractional crystallization. Facilities for synthetic phenol are nearing completion at Richmond.

Reference: "Oronite Chemical Co. Is . . . One of Largest Producers of Raw Synthetic Detergents," by D. H. Stormont, California district editor, The Oil and Gas Journal, February 9, 1953, page 106.

7 **New Acrylate Process in Rohm & Haas Co. Plant . . .** A new way of making ethyl and methyl acrylates was was introduced by Rohm & Haas Co. at its $8,000,000 installation completed in 1953 at its Houston plant. The new process reacts acetylene with carbon monoxide and an alcohol to make the acrylate monomers. At the present time acetylene is made from calcium carbide but future increased volume might lead to its manufacture from natural gas. The carbon monoxide and alcohols used in the process are petrochemicals. The new method is a continuous, catalytic process which avoids the disadvantages of the original Reppe process for manufacture of acrylic acid esters.

Reference: "New $8,000,000 Plant in Houston to Make Acrylate," by F. L. Resen, Gulf Coast district editor, The Oil and Gas Journal, May 4, 1953, page 92.

8 **Direct Oxidation of Butane to Acetic Acid . . .** This is done at Celanese Corp. of America's new Pampa, Tex., plant which has a design capacity of 1,800,000 lb. per week of glacial acetic acid. Selective conversion of butane by direct catalytic air oxidation is a Celanese development with conditions described as "relatively high pressure; relative low temperature; relatively high residence time" in comparison with conditions used previously for such reaction. Key to the success of the process appears to be in the specificity of the catalyst. No formaldehyde is produced. Higher aldehydes (mainly acetaldehyde) formed in the primary reaction are recycled to the reactor for further oxidation to the corresponding acids.

Reference: "High Acetic Acid Yield Obtained by Celanese at Pampa Plant," by G. L. Farrar, engineering editor, The Oil and Gas Journal, August 10, 1953, page 119.

9 **Phenol From Cumene at Montreal B.A.-Shawinigan Plant . . .** This plant is located adjacent to the British-American refinery at Montreal, Que. The plant has a rated capacity of 13,000,000 lb. of phenol per year and also makes 8,000,000 lb. of acetone. A propane-propylene stream from the refinery is employed. The propylene is alkylated to cumene using phosphoric acid catalyst at about 500° F. and 400 psi. At the B.A.-Shawinigan plant cumene is first oxidized with air to give cumene hydroperoxide which is then split to give a phenol-acetone mix that is separated by distillation.

The process employed was originally reported in Germany in 1944 and has been developed commercially by Hercules Powder Co. of Wilmington, Del., and Distillers Co., Ltd., of Edinburgh, Scotland.

Reference: "Phenol Synthesized From Cumene . . .," The Oil and Gas Journal, September 14, 1953, page 136.

10 **Butadiene and Copoly, Oil Black and Ammonia . . .** These are some of the petrochemical products made by Phillips Chemical Co., subsidiary of Phillips Petroleum Co. The natural-gasoline department of the latter company is responsible for the separation of raw hydrocarbon liquids into petrochemical feed stocks at central superfractionator facilities. Phillips Chemical Co. operates a butadiene and a copolymer plant near Borger, Tex. Close by is Phillips' furnace-black plant. Ammonia is manufactured at Etter, Tex., and a new ammonia plant is close to completion on the Houston Ship Channel. In addition Phillips operates two sulfur-conversion plants.

Reference: ". . . the Story of Phillips Petrochemical Expansion," by J. C. Reidel, petrochemical editor, The Oil and Gas Journal, January 12, 1953, page 82.

11 **Koppers Co. Makes Ethylbenzene at Port Arthur, Styrene at Kobuta . . .** There is an unusual raw material-transportation relationship underlying the operation of Koppers Co.'s Williams plant making ethylbenzene at Port Arthur, Tex. Ethylene is supplied to the Williams plant from the nearby Gulf Oil Corp. central ethylene-manufacturing plant. Benzene from eastern and southern coke plants is barged down the Mississippi. These barges are then used to ship ethylbenzene to the Koppers Kobuta, Pa., plant for the synthesis of styrene and polystyrene. Ethylbenzene is made by the Friedel-Crafts reaction at Port Arthur.

Reference: "Koppers Makes Ethylbenzene at Port Arthur Plant," by F. L. Resen, Gulf Coast district editor, The Oil and Gas Journal, June 15, 1953, page 142.

12 **Vinyl-Type Monomers From Petroleum Sources . . .** Vinyl chloride, vinyl acetate, chloroprene and acrylic monomers are most important, but others derivable from petroleum are coming forward. End uses are as polymers and copolymers in fibers, plastics, rubbers, gums, finishes, and soil conditioners. A combination of ethylene and acetylene reactions is considered most economical for production of vinyl chloride of which about 340 million pounds as polymers (excluding plasticizer) were made in the United States in 1952.

Reference: "Vinyl-Type Monomers From Petrochemicals," by C. E. Schildknecht, Stevens Institute of Technology, Hoboken, N. J., The Oil and Gas Journal, June 29, 1953, page 84.

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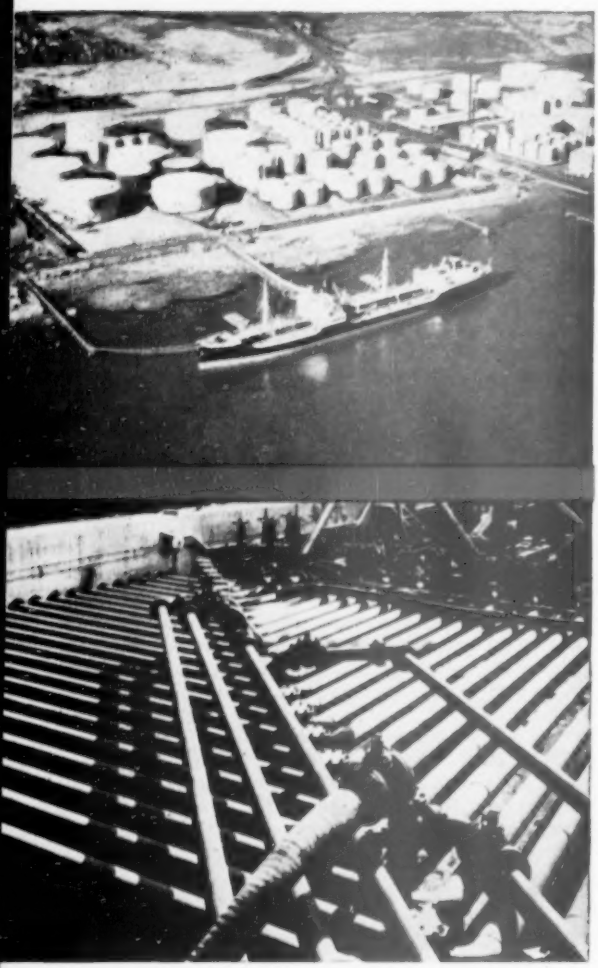

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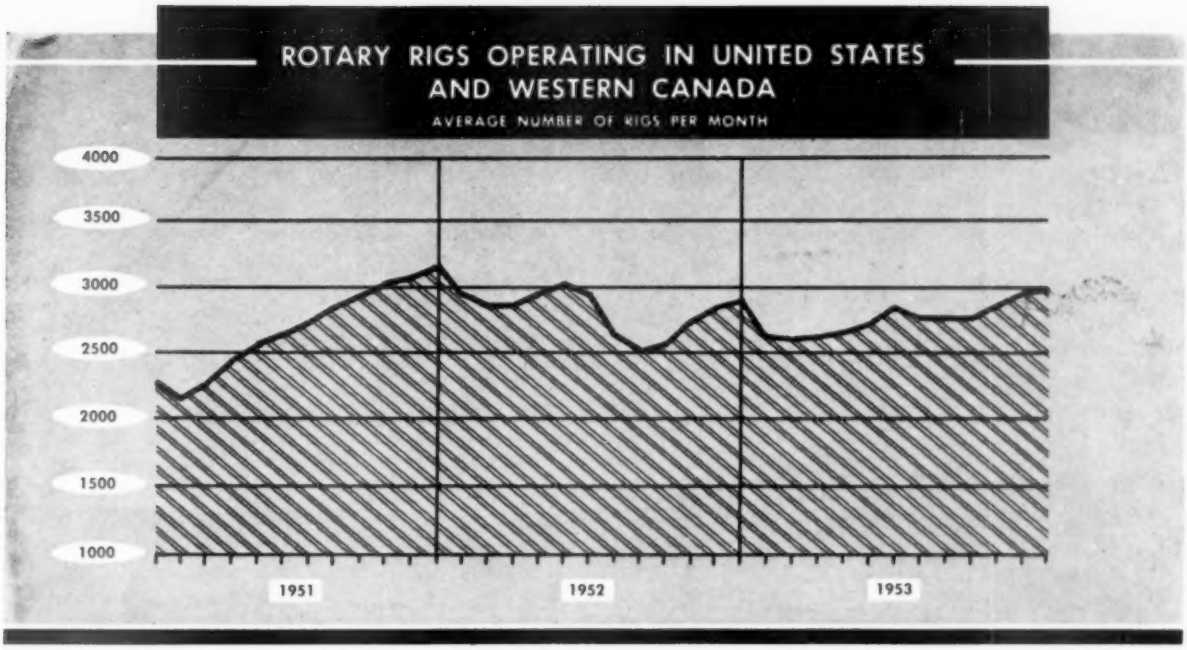


GOOD SECOND HALF

3,087 Rotaries Turning in Late December

by Neil Williams

ROTARY rigs operating in the United States and western Canada reached a total of 3,079 late in December. This peak for the year fell far short of getting back to the all-time record number of 3,181 rigs reported running late in 1951, but exceeded, although by only a relatively small margin, the 1952 high of 3,032 rigs.

The year 1953 opened with approximately 2,775 rigs in operation, more than 360 below the December peak, and in turn, nearly 200 under the number running at the beginning of the preceding year.

Remaining substantially below the 1952 levels throughout most of the first half of the year, the number of active rigs, after midyear, ran substantially above the levels of the corresponding period of 1952 until after the December peak. The margin of increase at one time exceeded 300 rigs. Since the December peak, the number has dropped sharply, putting the total under that of a year ago.

The fact that the last half of 1953 was able to show a substantial increase in operating rigs over the previous year may be due partly to the general curtailment of drilling operations which occurred during the last half of 1952.

It will be recalled that an acute scarcity of tubular goods, occasioned by the steel strike starting in June 1952, developed during July and August. This forced the postponement of much projected drilling, and the consequent shutting down and stacking of many rigs. In that curtailment of work, the number of active rigs dropped from midyear high of 3,032 rigs to a low, in August, of 2,470 rigs. With gradual resumption of drilling following the end of the strike and easing of steel supplies, the number of rigs got back, in December, to the midyear high, far short of a new all-time record previously anticipated.

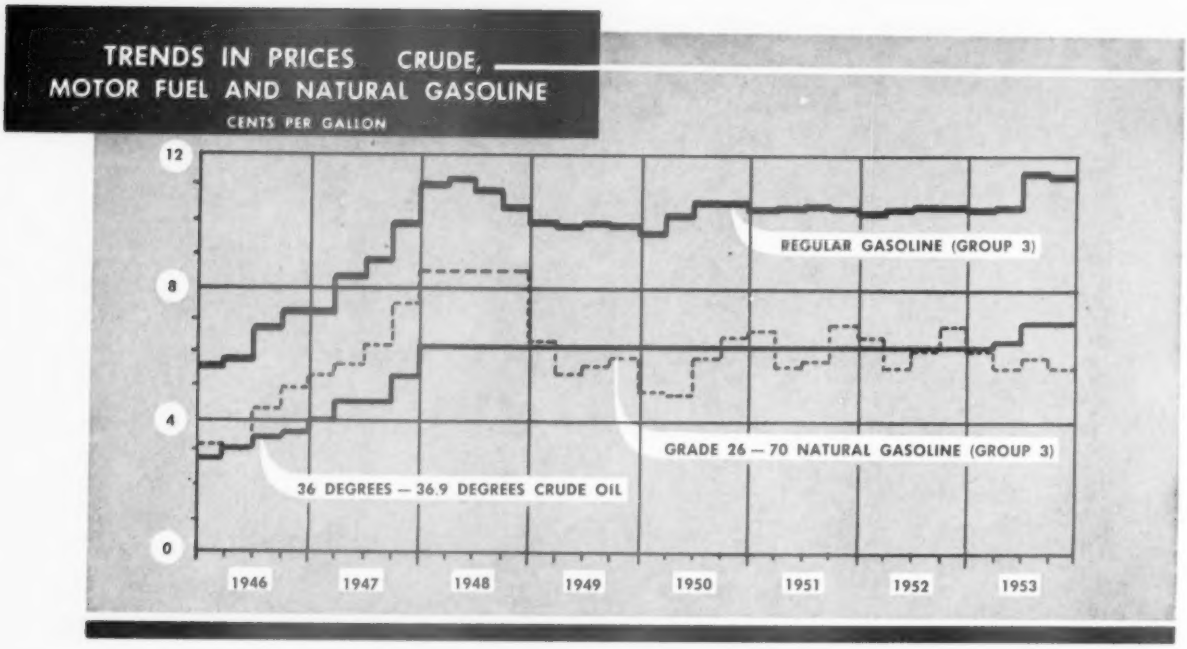
Although no new records were set during 1953 in the over-all total number of active rigs, drilling in several areas increased to new all-time high levels. In the Rocky Mountain region, 303 rigs were reported running the middle of December. This peak for the year was 43 rigs above the 1952 high of 260 rigs. Since midyear, the number of rigs running in that area has been consistently above the 1952 record.

Oklahoma's previous all-time record of 379 rigs reported running in December 1951 was broken in November with more than 390 rigs active. Increases since then have boosted the total above 400 with a peak of 413 rigs being reported for the ended December 21.

The Arkansas-North Louisiana-East Texas district, including northern Mississippi, reported 214 rigs running early in December, 8 above the previous all-time record of 206 rigs 2 years ago.

DISTRIBUTION OF ACTIVE ROTARY RIGS

	Dec. 31, 1953		Dec. 31, 1952		Dec. 31, 1951	
Area—	Rigs	% of total	Rigs	% of total	Rigs	% of total
Gulf Coast	605	21.6	649	23.1	643	21.0
N. & W. Tex.-N. M.	759	27.2	809	28.9	1,063	34.7
Ark.-N. La.-E. Tex.	199	7.1	146	5.2	191	6.2
Oklahoma	362	13.0	342	12.2	357	11.6
Kansas-S. Nebraska	128	4.6	172	6.1	171	5.6
Illinois-Eastern	138	4.9	117	4.2	126	4.1
Rocky Mountains	271	9.7	214	7.7	168	5.5
Pacific Coast	170	6.1	179	6.4	179	5.8
Total U. S.	2,632	94.2	2,628	93.8	2,898	94.5
Western Canada	163	5.8	173	6.2	162	5.5
Total	2,795	100.0	2,801	100.0	3,060	100.0



MONTH-BY-MONTH REVIEW

High Inventories Put Pressure on Markets

REFINERS and marketers started the year 1953 with 24,000,000 bbl. more primary inventories than at the beginning of 1952 and added 57,000,000 bbl. to storage during the year.

Product markets were generally under pressure from these inventories throughout the entire year. Heating-oil prices were, in some cases, lower at the end of the year than at the beginning despite increases in crude prices and in operating costs.

The Office of Price Stabilization removed price controls from crude and products in February, but product markets were too soft to support general product price increases.

Crude prices increased 25 cents a barrel, effective June 15. Heating-oil markets were not strong enough to sustain higher prices. Since the increase came early in the gasoline season, motor fuel was expected to carry most of the extra crude cost.

Higher gasoline postings resulted in still larger differentials between prices of gasoline and distillate fuels, and this wider differential tended to promote higher gasoline yields. These high yields, combined with high runs, left more gasoline in storage at the end of the year than ever before.

It is estimated that gasoline stocks will reach 180,000,000 bbl. by the end of the first quarter this year. Unless refiners and marketers make plans to store this volume of gasoline, distress material may break the market before the gasoline season gets started.

Every published forecast has indicated higher demands in 1954 than in 1953. Gross refinery realization will be up proportionately if refiners tailor supply to demand.

January . . . The year 1953 opened with a surplus of products in most marketing areas. Gasoline markets were under pressure from high inventories and excessive refinery production of motor fuel. An all-time record for gasoline production in a single week was established in the week ended January 3. Gasoline production is normally at a peak in the summer months.

By the middle of January, Group 3 prices for regular gasoline had dropped to 10.125 cents a gallon on the low from 10.375 cents at the first of the year.

Residual-fuel prices dropped on the East Coast and strengthened in the Mid-Continent. Esso Standard Oil Co. announced a cut in residual prices on the East Coast of about 10 cents a barrel, effective January 15. Group 3 residual moved up 5 cents to $.90-$1.05.

The first drop in natural-gasoline prices was a cut of 0.5 cent to 6.375 cents a gallon for Grade 26-70 on Group 3 market.

February . . . Price controls were removed from crude and all petroleum products except No. 2 fuel in the East on February 12. However, no product markets in the east were strong enough to support general price increases.

On the West Coast, crude and product prices were raised. The crude increase ranged from 10 cents a barrel for heavy grades to 50 cents for high gravity. Gasoline prices were raised 1.6 cents a gallon, and distillate moved up 1.8 cents. Residual fuel gained 10 cents a barrel. Effective date of the increase was February 16.

Also on February 16, postings for Pennsylvania Grade crude were raised 15 cents a barrel, making Bradford crude $4.40 a barrel.

Natural gasoline was cut 0.5 cent a gallon on February 16 and 0.375 cent on February 21 to 5.5 cents for Grade 26-70, Group 3.

March . . . An important factor in the solution of the low residual market in the Mid-Continent was reported in March. Several Mid-Continent suppliers

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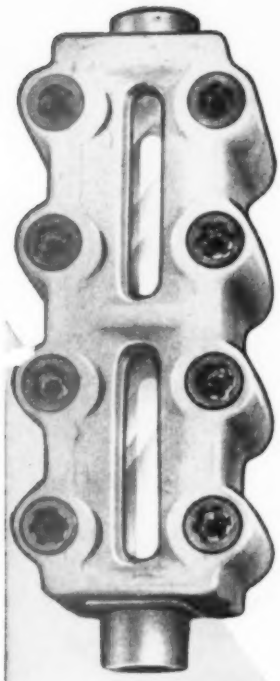

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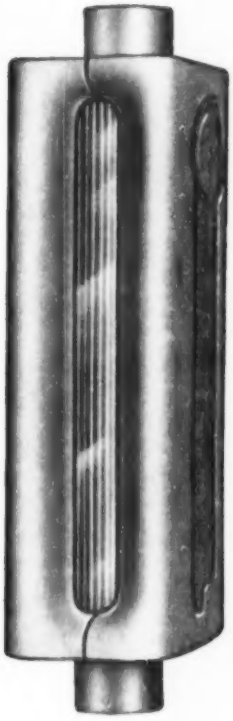

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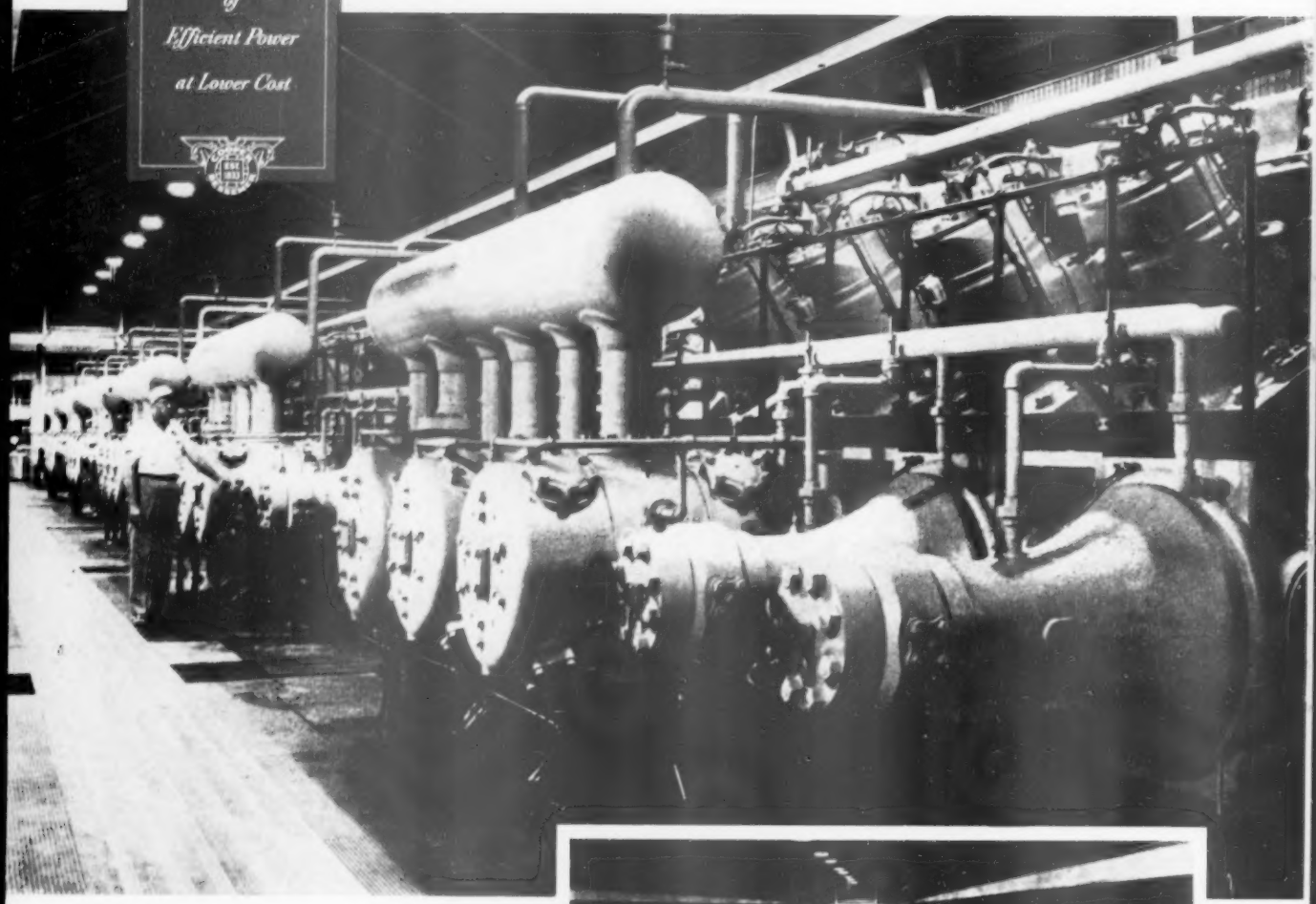
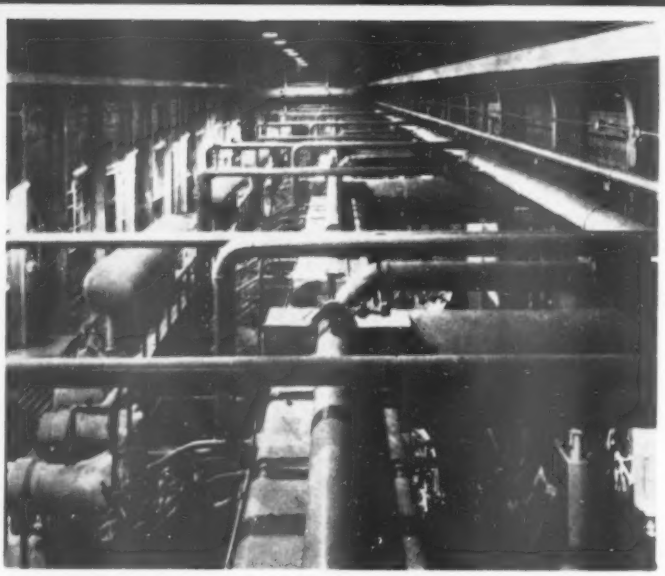


Line-up of six 4-stage GMV's, totaling 6,850 horsepower, in Willamar Pressure Maintenance Plant. First two stages compress 50-pound gas to 300 pounds. This gas and 300-pound field gas is then compressed for injection to 3,000 pounds absolute in remaining two stages.



Overhead view of Willamar GMV's. Plant has a rated initial capacity of 33 million cubic feet a day, with provision for easy expansion without waste to 58 million cubic feet a day.

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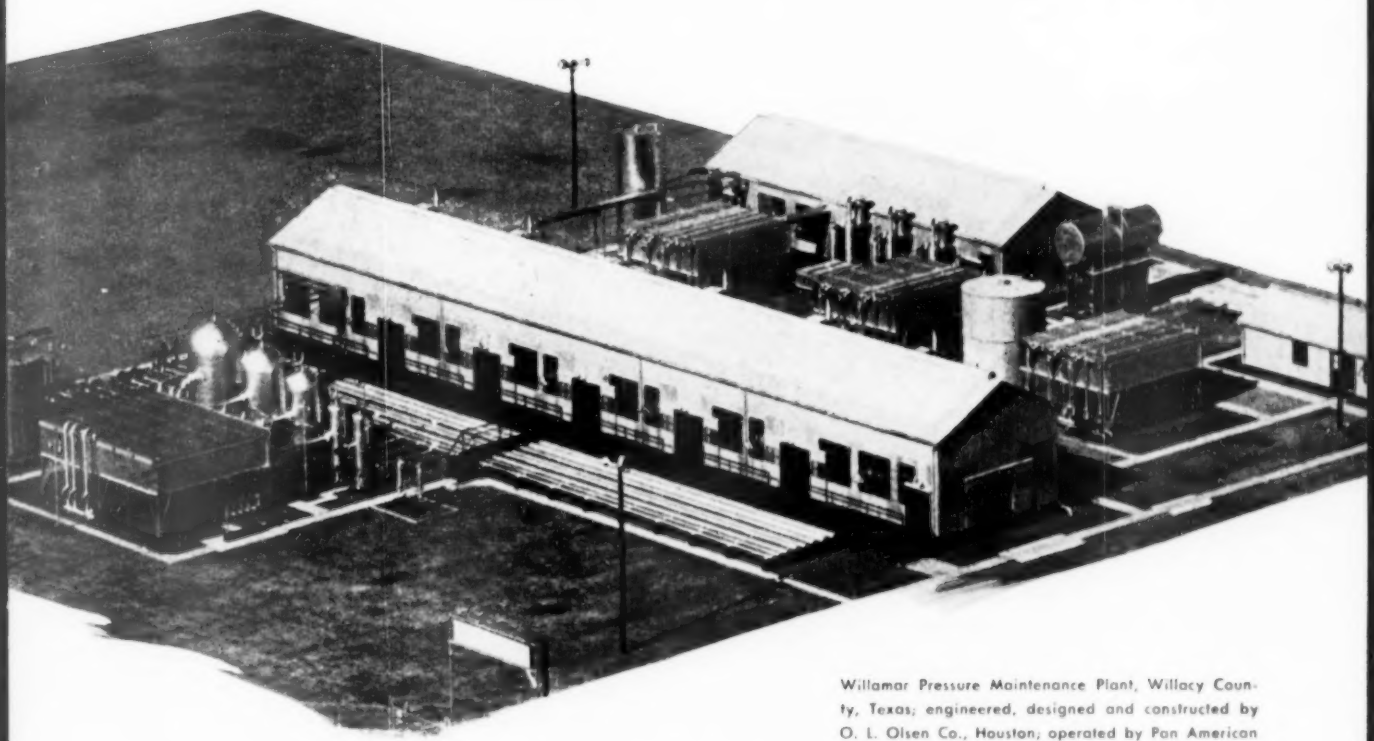

Willamar Pressure Maintenance Plant, Willacy County, Texas; engineered, designed and constructed by O. L. Olsen Co., Houston; operated by Pan American Production Co., under unitization agreement.

...Another big step in gas conservation

• IN the summer of 1951 flares were killed throughout the Willamar West field and Cooper-Bessemer GMV-angle compressors went on the line in one of the biggest repressuring jobs of its kind. Starting with 6 GMV's totaling 6,850 horsepower, and an initial capacity of 33 million cubic feet of gas a day, it is another important step in conserving Southwest Texas gas. The plant is designed for easy and economical expansion to an ultimate capacity of 58 million cubic feet a day.

A feature of the ultra-modern Willamar plant is its extreme flexibility. It permits efficient operation under widely varying conditions of gas pressure and volume — a decided advantage due to uncertainties in the trend of the field's gas production.

And, speaking of flexibility, that's also a long-recognized GMV feature — one that *often* permits big savings in meeting initial and subsequent requirements. But get the *whole* GMV story. It makes sense in dollars saved and performance gained in *all* kinds of compressor service.

by **Cooper-Bessemer**

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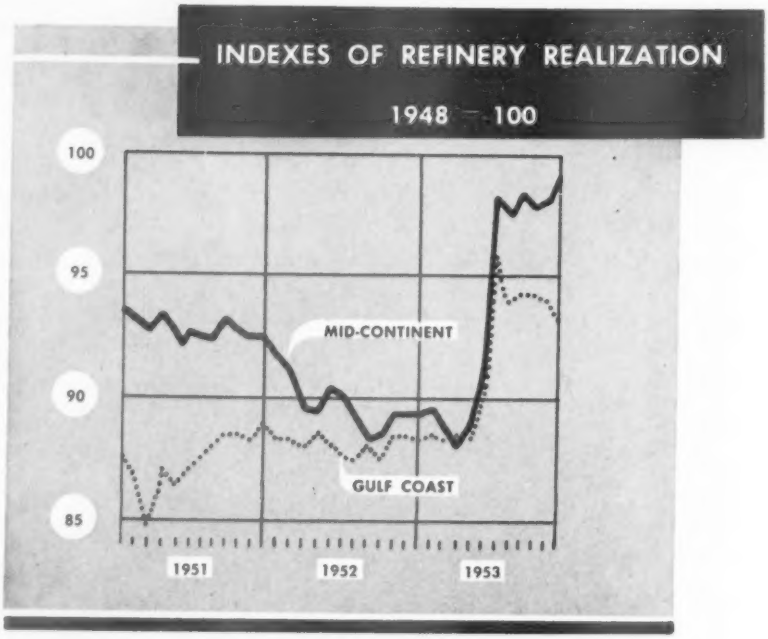
made contracts with utility companies for delivery of residual fuel at prices guaranteed to be competitive with coal. Most of these contracts were with utility companies in Kansas or near Kansas borders of adjoining states.

These contracts helped remove the surplus that was putting so much pressure on the market.

Socony-Vacuum Oil Co., Inc., raised the tank-wagon price of gasoline in its marketing territory by 0.5 cent a gallon late in February. Several marketers met the increase but later had to return to the original quotation because several large marketers did not go along with the raise.

Regular-grade-gasoline prices on the Gulf and East Coast were slightly lower at month end.



April . . . Esso Standard Oil Co. raised residual fuel prices 10 cents a barrel early in April. Quotations after increase were $2.00-$2.25 in New York Harbor and $1.60-$1.70 on the Gulf Coast. By the middle of the month, the New York price was up to $2.10-$2.25.

Esso Standard Oil Co. also announced a discount on kerosine and heating distillate for summer tank fills. The period was from the end of April to the end of September. The discount amounted to 0.3 cent a gallon for cargoes and 0.5 cent for other methods of delivery. The discount was off a normal posting of 9.65 cents a gallon for barge delivery of No. 2 fuel in New York Harbor.

May . . . Firming of residual markets on the East Coast was followed by a gain in the Mid-Continent. The Group 3 low moved up 5 cents a barrel to $.90.

June . . . Crude-oil purchasers increased prices paid for crude by 25 cents a barrel, effective June 16. New prices covered crude from all areas east of California except Pennsylvania Grade. Some corrections for underpriced and overpriced crudes were made at the same time.

Soft product markets in many areas tended to delay increases in product prices.

Gasoline prices were increased about 0.5 cent on the East Coast just before the crude advance was announced. Another 0.5 cent was added by June 24. Group 3 gasoline quotations moved up 1.0 cent, and Gulf Coast postings increased about 0.75 cent.

Kerosine and distillate postings were increased by 0.6 cent on the East Coast, but the actual spot market was up only about 0.15 cent. Group 3 spot prices increased 0.625 cent and Gulf Coast prices were up 0.5 cent.

Net increases in the lows of spot quotations for residual fuel were: 5 cents in Group 3; 15 cents in New York Harbor; and 15 cents on the Gulf Coast.

July . . . Heating oils lost most of the increase in postings early in July. Esso Standard Oil Co. announced a reduction in postings of 0.35 cent in the first week of July, leaving a quotation for No. 2 fuel of 9.4 cents in New York Harbor after the 0.5 cent summer-fill discount. Some spot material was available at 9.0 cents.

Heating oils lost about 0.125 in the Mid-Continent and on the Gulf Coast. Residual fuel had decreased 10 cents a barrel in New York by the end of the month.

August . . . Markets were generally a continuation of the July trends. Heating oils and gasolines were softer and heavy fuels gained strength.

Natural-gasoline prices were increased three times in August. Grade 26-70, Group 3, moved up from 5.5 cents to 6.375 cents.

September . . . Heavy product inventories and soft markets forced refiners to cut crude runs in September. Reductions did not show up in current figures until week ended September 19. Runs for the month averaged 7,023,000 bbl. daily compared with 7,163,000 bbl. daily in August.

The period for summer-fill discounts for heating oils on the East Coast ended September 30, but the market was so soft that there was no big rush to fill secondary and consumer storage before the end of the period. Discounts were withdrawn, but No. 2 fuel on the spot market remained at 9.15 cents.

October . . . Gasolines on the Gulf Coast spot market lost more ground during October. Prices for regular grade was off 0.25 cent to 11.0 cents at the end of the month.

Residual fuel on the Group 3 market moved up from a low of $1.10 at the end of September to $1.30 on October 31.

High inventories of finished motor fuel and blending components caused a break in natural-gasoline prices at a time when the market should have been in the strongest position of the year. Within a week after the middle of the month, Grade 26-70 on the Group 3 market dropped from 6.375 cents to 5.5 cents.

November . . . High inventories put more pressure on gasoline during the month. Tank-wagon prices in Ohio were off 0.2 cent a gallon. Socony-Vacuum cut wholesale prices in northeastern states about 0.25 cent. The reduction spread to the Gulf Coast. Group 3 prices were off about 0.125 cent.

Formal postings for kerosine and No. 2 fuel were cut 0.5 cent on the East Coast to bring them more in line with spot prices.

Group 3 residual increased 10 cents a barrel.

December . . . Further cuts in gasoline prices were reported. The reduction was 0.25 cent on the East Coast and Gulf Coast. Group 3 spot dropped 0.125 cent on the low.

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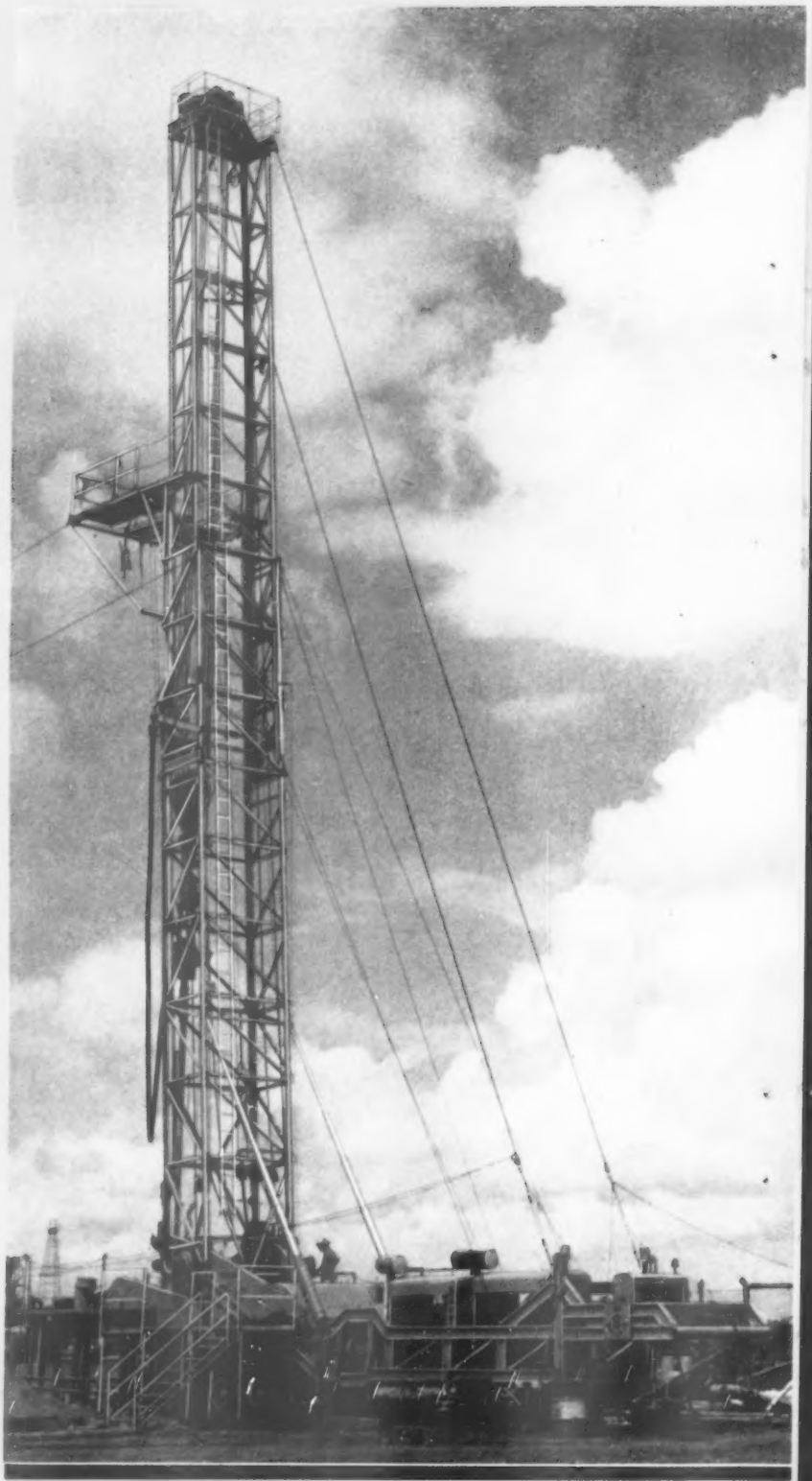

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Field Prices Key to More Gas Expansion

FPC holds club as 1954 opens . . . will it regulate all producers?

by Henry D. Ralph

WHAT happens to field prices of natural gas during 1954 will determine whether the expansion of the gas industry will continue at its phenomenal postwar rate or will grind to a halt.

A crisis was reached at the end of 1953 in the conflict between economic forces working to raise prices and political forces working to lower them. Under the impetus of rising prices, new gas reserves were developed and placed on the market, permitting the construction and planning of many new long-distance transmission lines. But the prospect that federal control would force well-head prices far below their current market value threatened to dry up the supply for new lines—and possibly cut it off from older lines also.

Ironically, it is the tremendous demand for its product that is causing the gas industry's problems. Competitive bidding has raised the price of favorably situated new reserves so much that producers in older fields are exerting great pressure to have their contracts renegotiated upward toward the new levels. And this has redoubled the efforts of consuming interests to have the Federal Power Commission reduce field prices.

The year ended with the FPC very definitely holding the club.

Field prices rise . . . Field prices of gas went up very considerably during 1953. This can't be measured statistically because there are no figures on average prices of gas for the country as a whole or even for big producing areas. Prices and contract terms vary with the purchasing company, the original date of the contract, characteristics and location of the reserve, and many other factors. Prices often vary from field to field within the same county or even from well to well within the same field.

Nevertheless, field prices went up considerably. The Office of Price Stabilization, which had been trying to hold new contracts to a top limit of 10 cents per 1,000 cu. ft., went out of existence in the spring, freeing field prices to react to competitive bidding. Since then, buyers seeking to commit gas reserves to new pipe-line projects have been offering around 15 cents per M.c.f. in many parts of the country, and at least one very large reserve in southern Louisiana was contracted at 20 cents.

This caused great unhappiness among gas producers in older fields, such as in West Texas, whose gas had been contracted at much lower prices, say 4 to 6 cents per M.c.f. Since most of these contracts were for a long period of years, often for the life of the field, there was little the producers could do beyond asking the purchasers to make voluntary upward adjustments.

A great many pipe-line companies did make upward adjustments, though not in all areas. The rising trend of gas prices which has been evident ever since the war and which was only slightly slowed by the 2-year period of the OPS had forced most purchasers to put various types of escalator and renegotiation clauses into their contracts.

Some of these contracts call for a fixed stepup in field prices every 5 years; others permit periodic reopening for price negotiation. Some companies voluntarily set a system-wide or area-wide minimum price, say 10 cents per M.c.f., and raised all old contracts to that level. A popular form of contract contains the so-called "most favored nation" clause. This takes various forms but its general objective is to eliminate discrimination among suppliers of a single company, and periodically the company raises old contracts to the level of its most recent prices.

Minimum-price laws . . . Another factor operating to raise the level of field prices is the minimum-price laws in Kansas and Oklahoma. These have been in effect for a couple of years and to date have been applied only to the portions of the huge Hugoton field in those two states. During the year both states raised these prices, to approximately 10 cents in Oklahoma and 11 cents in Kansas. One result of this was to put moral and political pressure on pipe-line companies to raise prices in nearby fields to or close to those levels.

The combined effect of these forces has been a decided upward movement in the average contract price of gas in most producing areas of the Southwest, though it is still far short of the 20-cent contract made in southern Louisiana. This was not a typical sale for many reasons. It was contracted by a new line projected to the East and which was able to make original delivery contracts justifying such a field price. The field is several hundred miles closer to market than fields in Texas, Oklahoma, and Kansas. It is an exceedingly large reserve, capable of supplying tremendous quantities of gas for many years. And the contract terms were unusually favorable to the pipe line in that it can vary its take over a wide range from season to season, whereas most older contracts require the purchaser to "take or pay" for a specific quantity of gas regardless of its needs. Still another factor in the high price was the fact that the seller was obliged to hold his gas without receiving any income for perhaps 2 years while the line was being financed and constructed.

For these reasons the figure of 20 cents per M.c.f. is not representative of the real value of all gas at the well head—at the present. But it does dramatize the sharp upward movement in gas prices and whets the appetite of other gas producers.

Competition rears head . . . While competition among transmission companies has raised field prices, competition with other fuels may set a ceiling on them. For the most part the new high field prices are being paid by new lines going into highly industrialized areas, chiefly in the East, where a considerable portion of the market is for commercial and industrial uses. Such consumers weigh the heating value of gas against that of coal or oil, and will not use gas if the price is too high.

Some economists figure that at the present prices of coal and residual fuel oil in New York Harbor, gas could not compete for the industrial market on the eastern seaboard if field prices go above 25 cents per M.c.f. in Louisiana. The competitive ceiling would be proportionately lower in fields at greater distances from the market or where volumes and pressures are low.

Householders might pay somewhat more than the equivalent heat-content price of other fuels because of the convenience and cleanliness of gas. But the bulk of this demand comes in the winter only. So, until the last couple of years, transmission companies have had to depend on a big volume of industrial sales at low prices to keep their lines going through the summer.

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gas. Virtually every transmission company is searching for suitable storage areas close to consuming markets, preferably depleted gas fields or geologically tight water-filled formations. The ideal is to have enough storage close to market so that the line can operate at capacity all summer filling the storage in preparation for the winter peak withdrawals.

Thus it would be unnecessary to make summer-time sales of gas to low-priced industrial markets, and all gas would go to the "premium" household market. A few systems are making considerable progress toward this goal, and the development of additional underground storage is proceeding rapidly.

While all these factors are operating to increase field prices of gas, the power of the federal Government is operating to force prices down.

FPC regulation . . . Every transmission line crossing a state boundary is regulated by the Federal Power Commission, which sets the rate at which gas is sold at the "city gate" to a local distributing company. Naturally the local distributors, and the state and municipal commissions which regulate them, want prices as low as possible.

All costs of transmission companies have been going up ever since the war, particularly the price of gas purchased. The pipe lines have deluged FPC with applications for rate increases to cover these costs. Virtually every application for increase requires a lengthy hearing at which consuming interests use every means to beat down the rate, and this causes great delay in obtaining a final decision. The backlog of rate cases piled up in the FPC has been huge, and transmission companies often have to wait for many months before knowing whether or not they will be allowed enough income to justify higher field prices.

Apparently it is not too difficult to sell gas at relatively high prices in an entirely new market, but it is quite something else again to get prices raised in a community which has had low-priced gas for years. The FPC has readily approved construction of new lines based on contracts of 15 to 20 cents per M.c.f. in the field, but at the same time its method of regulation imposes serious obstacles to increases in gas costs to older lines. This is one reason for the wide variance in field prices, viewed by producers as discrimination.

Until a couple of years ago, FPC never questioned the field price paid by a pipe line for gas produced by an independent producer not affiliated with the pipe line. This price was treated as an operating cost, like wages or the price of pipe, and rate regulation was confined to the pipe line's own investments and operations. Where a pipe line produced its own gas, FPC allowed a price based on a fair return on the actual investment in the producing wells.

Situation now different . . . But now the situation is changed — radically. During the year the courts directed FPC to regulate the price at which gas is sold to an interstate line by an independent producer. This came about in the case of Phillips Petroleum Co. which the Supreme Court, on November 30, declined to review.

What FPC will do with this new authority is a question, but its potentialities have cast a pall over the entire gas industry.

The way seems open for FPC to set aside all gas-purchase contracts and fix new prices on the basis of actual cost of production. In the case of many producers, particularly those fortunate enough to find big reserves with moderate exploration expense, this cost will be far below the present field price. Naturally it will have no relation to the intrinsic value of gas as compared with the price and heat content of competitive fuels.

This will bring under federal regulation several thousand gas-well owners, oil producers, and operators of natural-gasoline plants. Many of these are threatening to cancel their contracts rather than submit to federal regulation as public utilities, but the legality of such a move is questionable.

In recent years many transmission companies have set up their own producing companies to explore for and develop reserves for sale to the parent pipe line. Gas sales by such subsidiaries have been made at prevailing field prices or on the same basis as sales by independent producers. The theory was that a pipe line owed it to itself and its customers to have control over a certain percentage of its gas supply, and to have a connection with an organization vigorously engaged in developing new reserves.

Until the Phillips decision it was assumed that such producing subsidiaries would be free from FPC regulation, but now it would seem that any gas moving into interstate commerce is subject to price regulation.

No protection . . . Nor can producers get protection of their prices through state minimum-price laws, because of another court ruling in 1953. Northern Natural Gas Co. produces some gas from its own wells in Hugoton field where the Kansas Corporation Commission established a minimum price of 8 cents per M.c.f. at the well head. FPC did not question this price for gas purchased from other Hugoton producers but refused to allow the 8-cent price to be "attributed" to the company's own production. Instead, FPC set a lower price based on cost of production, and the courts upheld this action.

Coupled with the Phillips case, this indicates that when FPC begins to regulate the prices at which producers sell to interstate pipe lines it can ignore state minimum-price laws, thus making those laws ineffective except as to sales of gas for consumption within the state.

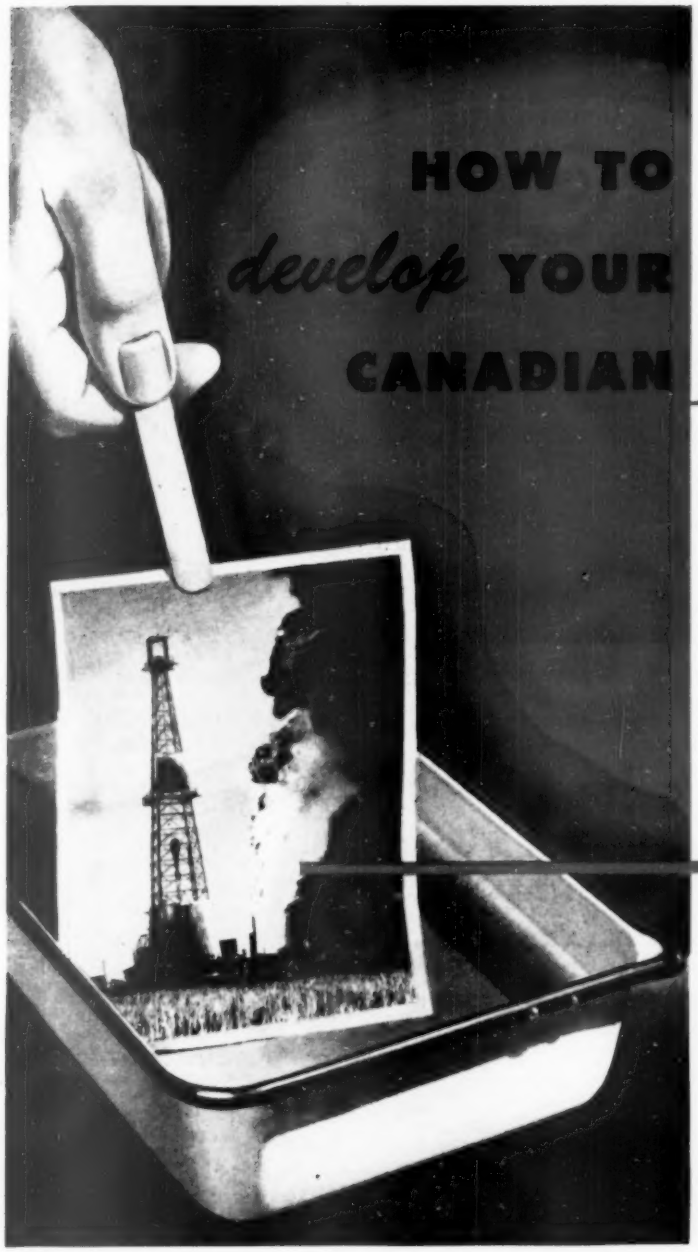
The reasoning behind FPC's campaign to reduce field prices is that consumers benefit by low prices. Producers see another side to this, arguing that if prices are low, nobody will want to sell gas for interstate movement, that it will be unprofitable to explore for and develop new gas reserves, and that out-of-state consumers will soon have hardly any gas at all. To this the producing states add the argument that a decent price for gas is necessary to encourage conservation and that they cannot well stop the flaring of gas unless the operators are assured of a profitable market.

Seek only parity . . . Producers say that they are not trying to gouge consumers, but simply want the price of gas to be allowed to rise to something like parity with the heating value of other fuels. They also point out that the field price of gas is such a small proportion of the price at the homeowner's meter in a distant state that doubling the field price would make only a very small percentage change in the customer's bill.

The rate-making formula used by FPC to date is particularly unsuited to fixing the field price of gas because it takes no account of the cost of drilling dry holes and the many other risks inherent in discovering and developing a gas field. Producers insist that they simply cannot do business under it.

It is freely predicted that if FPC persists in its apparent intention to determine the producing cost for each separate lease supplying interstate lines it will become so bogged down with the task that, as a practical matter, it will simply have to abandon the whole thing. If things reach too bad a pass, Congress may be induced to amend the law and eliminate or define FPC's jurisdiction over gas producers and field prices.

So 1954 opened with a series of big question marks facing the natural-gas industry. Will FPC regulate all producers? Will it force field prices down to bare cost of production? Will this cause producers to refuse to sell for interstate movement? Will it discourage development of new gas reserves?



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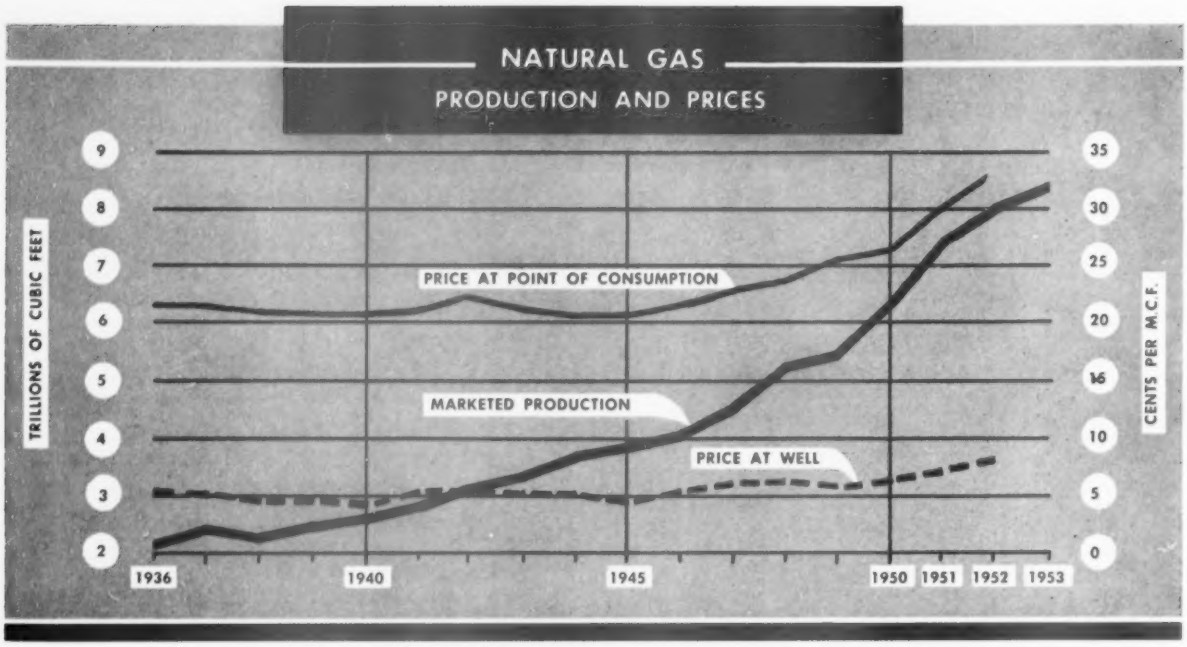


MORE EXPANSION SEEN

Natural Gas Heads for Still Another Record

by Joseph A. Kornfeld

MARKETED natural-gas production in the United States should rise about 6 per cent in 1954 to 8.9 trillion cubic feet to establish another record. More than 84 per cent of this volume will continue to be supplied from the southwestern states comprising Texas, Louisiana, Oklahoma, Kansas, and New Mexico. About 55 per cent of the total requirements of the United States during 1954 will come from Texas.

Gulf Coast . . . Major drilling will continue during 1954 in development of natural gas-distillate reserves in the Gulf Coast region of Texas and Louisiana. Considerable work will be conducted in many deep gas fields in South Texas producing from Oligocene sandstones. A significant reserve is under development in inland waters extending from Port Lavaca to Brownsville. Other work is under way on faulted Eocene structures along the Wilcox trend lying inward from the coast.

In South Louisiana, new gas supplies will come principally from faulted Miocene sand reservoirs lying in the coastal parishes including the deep Miocene basins under the Mississippi River Delta region.

Rocky Mountain Province

San Juan basin is the greatest gas-producing area in the Rocky Mountain

GROWTH OF MARKETED PRODUCTION OF NATURAL GAS IN THE UNITED STATES BY STATES FOR VARIOUS YEARS FROM 1940—1953 INCLUSIVE

(All volumes in millions of standard cubic feet)

State—	1953	Per cent change over 1952	1952	Per cent change over 1951	1951	Per cent change over 1946	1946	1940
Texas	4,502,456	+ 8.6	4,147,805	+ 9.7	3,781,136	+ 112.9	1,776,148	1,063,538
Louisiana	1,290,233	+ 4.3	1,237,143	+17.4	1,054,199	+ 100.7	525,178	343,191
Oklahoma	516,749	− 6.7	554,033	+ 2.8	538,756	+ 41.4	380,038	257,626
California	556,405	+ 7.5	517,450	− 8.7	566,751	+ 16.2	487,904	351,950
Kansas	427,963	+ 3.7	412,544	− 1.2	417,538	+ 136.3	165,725	90,003
New Mexico	387,429	+10.9	349,229	+16.3	300,169	+ 151.7	119,262	63,990
West Virginia	183,472	+ 1.4	180,995	− 5.3	191,146	+ 6.8	178,958	188,751
Mississippi	170,465	− 2.1	174,100	+ 9.6	158,845	+2,098.5	7,225	636.5
Pennsylvania	86,528	−20.4	108,684	−15.6	128,715	+ 39.2	92,443	90,725
Subtotal 9 states	8,121,700	+ 5.7	7,681,983	+ 7.6	7,137,255	+ 91.2	3,733,781	2,456,139
Others	301,547	− 6.2	321,326	+ 0.4	320,104	+ 7.8	296,824	204,083
Total United States	8,423,247	+ 5.2	8,003,309	+ 7.3	7,457,359	+ 85.0	4,030,605	2,660,222

province. Natural-gas production from the New Mexico portion exceeded 65 billion cubic feet during 1952 and totals for 1953 should reflect a significant increase over 1952. Stepped-up drilling is expected during 1954 to boost deliverability for wells connected to major natural-gas transmission systems such as El Paso Natural Gas Co.

Total proved developed reserves from the New Mexico portion of the San Juan basin totaled 14.4 trillion cubic feet as of January 1, 1954. Dry-gas reserves accounted for 11.2 trillion cubic feet from nearly 1.8 million proved productive acres. Remainder of 3.2 trillion cubic feet is gas associated with oil reservoirs under 8,000 proved productive acres.

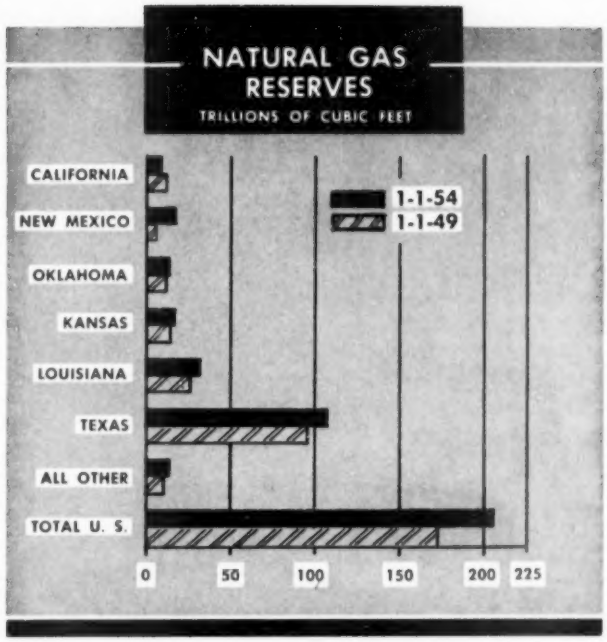
Wasatch plateau . . . Exploratory drilling will continue on the high-displacement, faulted structures of the Wasatch plateau of Central Utah near Price. At Clear Creek gas field, Three States Natural Gas Co. has completed 13 gas wells in Cretaceous sandstone reservoirs with proved developed reserves of at least 1.2 trillion cubic feet. Additional exploration will be conducted in search of Pennsylvanian gas reservoirs in the Paradox basin.

Green River basin . . . Big Piney gas field development in the overthrust belt along the west limb of the Green River basin will figure in future Wyoming gas development. Exploration for gas reserves will continue in this basin for the next several years principally from Cretaceous and Tertiary objectives.

Big Horn basin . . . Development of important sour-gas reserves from the Phosphoria rocks will be conducted on the northeast limb of the Big Horn basin. Recoverable reserves range from 400 to 800 billion cubic feet of gas containing from 8 to 50 per cent of sulfur by volume. These promise a recovery of from 4 to 5 million long tons of elemental sulfur. Sulfur-recovery plants are in operation at Worland, Elk Basin, and Silver Tip fields.

Mid-Continent . . . Exploratory drilling will be conducted during 1954 on the western side of the Anadarko basin in Texas, Oklahoma, and Kansas in search of deep gas reservoirs in the Pennsylvanian and Mississippian rocks. Offset work continues in the Liberal, Keyes, and Greenwood gas fields.

Hugoton, Kansas, gas field is now producing nearly 4.8 billion cubic feet of gas per day from nearly 2,000,000 acres in the nine-county area from the Permian limestones. Recent discovery of gas from the Pennsylvanian-Topeka limestone marks the first deep gas find under this major field.



ESTIMATED PROVED RESERVES OF NATURAL GAS IN THE UNITED STATES

(Billion cubic feet at 60° F. and 14.65 psia.)

State—	Jan. 1 1954	Jan. 1 1953	Change
Arkansas	980	930	+50
California	9,300	9,500	−200
Colorado	1,450	1,400	+50
Illinois	225	225	0
Indiana	32	30	+2
Kansas	15,000	15,000	0
Kentucky	1,300	1,300	0
Louisiana	32,000	30,000	+2,000
Michigan	200	200	0
Mississippi	2,700	2,600	+100
Montana	900	800	+100
New Mexico	16,000	10,000	+6,000
New York	66	65	+1
Ohio	700	650	+50
Oklahoma	12,000	12,000	0
Pennsylvania	800	800	0
Texas	106,000	107,000	−1,000
Utah	1,200	80	+1,120
West Virginia	1,650	1,700	−50
Wyoming	2,600	2,500	+100
Others	250	200	+50
Total U. S.	205,353	196,980	8,373

Output Reaches New High in 1953

Marketed production of natural gas in the nation climbed during 1953 to an estimated 8.423 trillion cubic feet (measured at standard pressure base of 14.65 psia.). This is a gain of 5.2 per cent over the 1952 total figure of 8.003 trillion cubic feet.

Texas . . . More than 53 per cent of the 1953 marketed natural-gas production in the nation came from Texas and 4.502 trillion cubic feet was produced from the state during the year. This output represents a rise of 8.55 per cent over the 1952 figure of 4.147 trillion cubic feet.

The steady rise of Texas as a major natural-gas source in the nation is reflected by the following correlation by years since 1946:

RISE OF TEXAS NATURAL-GAS PRODUCTION FROM 1946-1953

Data: U. S. Bureau of Mines.

(All volumes in trillions of standard cubic feet)

Year	Texas	U. S.	Per cent of U. S. total
1946	1.776	4.031	44.1
1947	1.993	4.582	43.6
1948	2.290	5.148	44.5
1949	2.589	5.420	47.8
1950	3.126	6.282	49.8
1951	3.781	7.457	50.6
1952	4.148	8.003	51.7
1953	4.502	8.423	53.5

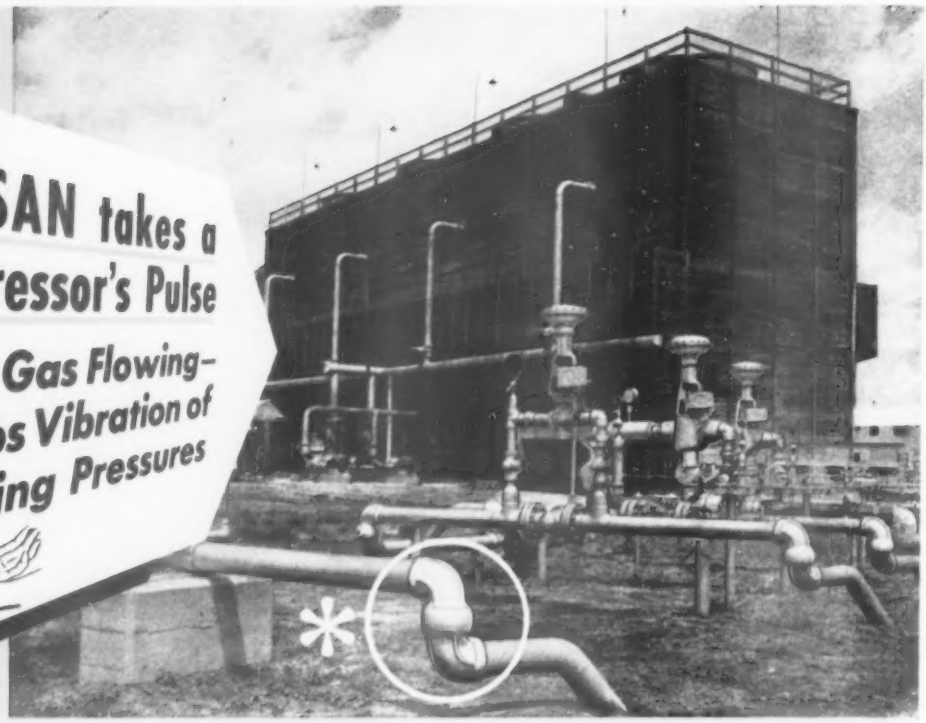
During 1946, at the end of World War II, before the bulk of the major natural-gas-transmission lines of the Gulf Coast were built, Texas marketed only 1.776 trillion cubic feet. In 1940, Texas produced only 1.063 trillion cubic feet which is nearly one-fourth of the 1953 annual figure.

More than two-thirds of the total natural-gas supply in Texas came from natural-gas wells during the year 1952. While the proportion of supply sources between gas-well gas and formation gas (casing-head gas produced from oil reservoirs) varies throughout the year, the September 1953 analysis illustrates the current status of supply sources:

Source—	Wells	Marketed volume	Per cent of total
Gas wells	9,848	9.9	67.5
Oil wells	89,648	4.7	32.5
Totals for Texas		14.6	100.0

CHIKSAN takes a Compressor's Pulse

Keeps Gas Flowing— Absorbs Vibration of Changing Pressures



NOT only do the stamina and flexibility of Chiksan Joints take expansion in their stride, they absorb pulsation and vibration.

When the Plymouth Oil Company wanted a better way to handle the expansion and contraction of its 2500-3500 lb. natural gas re-pressuring line in its compressor station in Sinton, Texas, back in 1946, it tried Chiksan 2-inch high pressure ball bearing swivel joints. So successful were Chiksan Joints in this application, they were adopted for 3 and 4-inch lines for the same purpose. In addition, by placing regulators, gauges and other recording equipment on a bridge using Chiksan Joints, accurate readings of the instruments could be obtained.

Since 1946, not one of these Chiksan Joints has been replaced or even repacked, and they are giving the same economical, dependable service they did when first installed.

In Texas or California — all over America and all around the world — wherever production, processing or distribution depends on the flow of liquid or gas or on the dependability of hydraulic systems, there you will find Chiksan Ball Bearing Swivel Joints on the job — adding muscle and flexibility — cutting down on shut-downs and maintenance.

Whatever your business, if gas or liquid plays a part, Chiksan's Research and Development Division can help you add efficiency, safety and economy to your operation.

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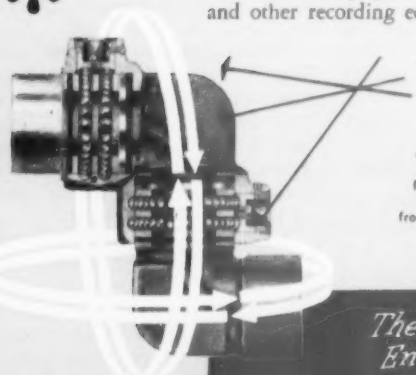

CHIKSAN Ball Bearing Swivel Joints are THE NEW TOOL of Modern Industry — with full 360° rotation in 1, 2, and 3 planes. Over 1,000 different types, styles and sizes have been developed for pressures and services from 28" vacuum to 15,000 psi and for temperature ranges from minus 75° to a plus 500° F. with packing materials for each specific type of service.

The Flow of Enterprise Relies on **CHIKSAN** *Ball-Bearing Swivel Joints*

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Well Equipment Mfg. Corp. (Division), Houston 1, Texas • **Chiksan Export Company (Subsidiary), Brea, California** • Newark 2, N. J

Tidelands Bill Passes
Senate approves measure 56 to 35; conference
expected to produce acceptable
New Refinery on Stream
commence operation of big plant at
Italy; SARPOM is operating company
Deepest Crossing Set
First of two 21,000-ft. lines across Straits of Mackinac
to be pulled
Crude Output Hits New High
production shows 100,000 bbl. daily increase
for the third consecutive mont
28.9 Billion Pounds
of Petrochemicals . .
Oil Show to Open
Pipe Line project
First of an expected 500,000 visitors to enter I.P.E.
grounds Thursday morning to see latest in oil equipment
Inshore Areas Active
Operators continue to discover and
gas in shallow bays and bayous
More Octane Pressure
Higher compression ratios, horsepower ratings of
to clamor
These were among
OIL HEADLINES IN '53
Atlantic to Expand
Principal contracts are awarded for
and expansion program at company's
Big News in Wil
rank wildcat discovery
in North Dak
New Oil Law
But companies still are
Egypt because of serious
w Area Opened
aves County test, north of all existing
utheastern New Mexico, flowing 12 to
-Catalyst Results
Sinclair claims excellent yield of high-octane pro
n pilot-plant operations of
forming pro
Marshy Line Finishe
Evangeline products system traverses 191 m
water-logged land between
The New Congress
cies—and new probes—will be in the
gh on the legislative schedule
Depth Record Broken
Ohio Oil passes previous mark of 20,521 ft. after
2 years of drilling on deep
Oil Ac
New Processes Detailed
Shell, Anglo-Iranian describe methods for catalytically
distillates at A.P.I. meet
s Cited
ogued industry set new drilling
tly to plants and pipe lines in 1952
more than a week
Tidelands Move Rumored
Reports that President contemplates declaring submerged
oil lands as naval petroleum reserves stir new Congress
Drilling-Depth Record Stretched
Ohio's California wildcat coring
after breaking former record in
Sahara Search Pushed
Three groups now carrying out exploratory operations in
area comprising about 270,000 acres in southern Algeria

THE easing of tensions at home and abroad which marked 1953 was reflected in activities of the petroleum industry during the year.

The new administration which took over in Washington in January lessened federal controls and federal competition in many respects. Truce in the Korean conflict ended the defense-dictated controls and also caused a slackening in industrial mobilization which was reflected in slowing the growth of demand for petroleum products. It was the year in which oil, and industry generally, caught up with requirements.

Price controls were the first to go, and by early spring prices of crude in California and the Penn Grade area went up and the entire products market was free to fluctuate normally. Allocation of materials ended in midsummer, and while there was some tightness in oil-country tubular goods for a while, the last half of the year saw general availability of all materials and equipment items needed by the industry.

Shrinkage of federal activity resulted in ending the Navy's long search for oil in northern Alaska. The Bureau of Mines closed its demonstration plants for making synthetic fuel from coal and offered them for sale. New legislation offered for private sale the synthetic-rubber plants which the Government had operated during and since World War II. The "tidelands" stalemate was ended by two laws returning to the states administration of offshore oil development within their historic boundaries and setting up federal administration for the Continental Shelf.

But the industry didn't have everything its own way in Washington. In June there was a general increase in crude prices of 25 cents per barrel which precipitated a hostile investigation by a House committee and the introduction of several bills for federal control. And Congress took no action on legislation to offset the action of the courts in sanctioning extended authority of the Federal Power Commission over production of natural gas.

The threatened shortage of petroleum supplies which had shadowed the two preceding years dissolved into an actual surplus during 1953 as crude production and refinery runs reached new highs. As a result, many producing states, primarily Texas, had to hold down their allowables month after month. At the same time imports continued to increase, causing an embarrassing buildup of inventories. Domestic producers carried on a vigorous campaign to get imports curtailed, but a bill imposing quotas on imports failed of approval in the House.

But slackening demand and oversupply did not crimp the industry's advance during 1953. New records were set in the activity in many divisions, oil and gas reserves were developed in many new areas, and expansion continued in refineries, pipe lines, field processing plants, and reservoir-control projects. Advances were notable in refining, particularly in the addition of catalytic reforming and other new processes, presaging more intensive competition in gasoline marketing.

On the following pages are briefed some of the major events of the year which at the time held the industry's interest and which pointed up trends in the industry's course.

. . . and the Events That Made Them

JANUARY . . .

Texas Railroad Commission asks major oil companies to file schedules of 1953 importing programs.

Eighty-third Congress opens its initial session. Legislation introduced on opening day concerns tidelands, air pollution, mineral interests, natural gas, public lands, tankers, and tariff. President Truman submits annual State of the Union message without recommendations for legislation.

Atlantic Refining Co. begins operation of test plot to study effectiveness of new "imbibition" water flood in Spraberry.

Spraberry Trend Area field designated by Texas Railroad Commission

and given 80-acre spacing following months of argument.

PAD places number of wells drilled in 1952 at 46,000, a new record. This was about 1,500 higher than in 1951 but 4,000 short of the 50,000-well goal set by the agency. PAD said the failure to attain the goal was due to the inability to secure material rather than to any slackening of effort. The drilling division, it said, suffered most from the steel strike.

Bureau of Mines predicts total demand for U. S. crude and products will average 8,000,000 bbl. daily in 1953, with domestic demand running about 7,646,000 bbl. daily. The total demand would be about 3.8 per cent higher than in 1952. The domestic average would be 4.9 per cent higher. Exports, PAD said, will drop about 354,000 bbl. daily.

Pacific Oil & Refining Co. announces it will begin construction early this year on a new 10,000-bbl. refinery on Puget Sound near Seattle. Facilities will include catalytic cracking. Crude would come from Alberta via Trans Mountain. Completion of the plant is scheduled for early 1954.

Oil companies accused of participating in an international oil cartel reject Government offer to drop the grand jury investigation. Company counsels contend the offer was made subject to a condition which would force them to accept civil suits on a basis favoring the Government 100 per cent.

PAD estimates total demand for U. S. crude and products will average about 8,031,000 bbl. daily, domestic demand about 7,693,000 bbl. daily. These estimates are 31,000 and 47,000 bbl. daily, respectively, over those issued by the Bureau of Mines a week earlier.

Alberta schedules its first sale of natural-gas rights without accompanying oil rights for February 6. Acreage on the block totals almost 50,000 acres in the Fort Saskatchewan and Pakowki Lake areas.

Pioneer Pipe Line Co., owned by Continental Oil Co. and Sinclair Pipe Line Co., delivers first shipment of products through its new 300-mile, 8-in. line from Sinclair, Wyo., to Salt Lake City.

World's first commercial Fluid Hydroforming unit is placed in operation by Pan-Am Southern Corp. at its Destrehan, La., refinery near New Orleans.

Esso Standard Oil Co. approves huge modernization program for its Bayway refinery involving construction of a new 60,000-bbl., three-stage crude-distillation unit, a 20,000-bbl. Hydrofining unit (the first commercial unit of its kind), and a high-viscosity fuel-burning system.

Shell Oil Co. reported planning construction of a 50,000-bbl. refinery in the Puget Sound area in Washington provided that state clarifies its land laws. Crude supply would come from Alberta via the Trans Mountain pipe line.

Northwestern Refining Co. completes first unit, a 5,000-bbl. cat cracker, of an expansion program which will increase crude capacity of the refinery at St. Paul Park, Minn., by 500 per cent—from 6,000 to 30,000 bbl. daily.

FEBRUARY . . .

A revolutionary type of oil-field pump using sound waves to lift fluid completes 9-month test successfully in 1,000-ft. well near Bakersfield, Calif. Pump is property of Soundrive Pump Co., Los Angeles. Tests were conducted by Standard Oil Co. of California.

Long-delayed grand jury investigation of the alleged international oil cartel is deferred another 3 months by District Judge James Kirkland to give new Atty. Gen. Herbert Brownell a chance to determine his course of action.

Kansas Corporation Commission issues order (effective February 1), granting higher allowables to wells producing below 4,500 ft. in an effort to induce operators to drill deeper in western Kansas.

Turkish Government lets contract for construction of a 6,350-bbl. refinery in the southeastern oil-producing region of the country to Ralph M. Parsons, Los Angeles.

Ground-breaking ceremony is held January 31 at Kwinana in western Australia to mark the start of construction work on the 100,000-bbl. refinery of Anglo-Iranian Oil Co., Ltd.

Exploration rights over an area of about 36,000 sq. miles in British East African Protectorate of Somaliland are granted Conorado Petroleum Corp., a Canadian subsidiary of Continental Oil Co., Ohio Oil Co., and Amerada Petroleum Corp.

Texas Railroad Commission approves the installation of the world's biggest secondary-recovery project in West Texas Kelly, Snyder and Diamond M fields of Scurry County. The project is estimated by the Scurry Area Canyon Reef Operators Committee to recover 720,000,000 bbl. of additional oil. It will go into operation March 1.

Third Court of Civil Appeals in Austin overrules lower court and holds Texas' controversial natural-gas gathering tax to be constitutional and not an undue burden on interstate commerce. Attorney for the companies say the decision will be appealed.

President Eisenhower promises "hospitable climate" for American investment abroad in his first annual message to Congress. No reference made to cartel case, tidelands, synthetic liquid fuels, or other oil issues.

Creole Petroleum launches one of the biggest gas-return operations ever undertaken for pressure maintenance of a single oil reservoir. The project, in one of the major Bolivar Coastal field reservoirs in Lake Maracaibo, Venezuela, involves construction of a plant on a platform over 62 ft. of water which is designed to inject 130,000,000 cu. ft. of gas daily.

Creole completes 143-mile, 26-in. crude line from Ule to Amuay in western Venezuela. At capacity the line will carry 180,000 bbl. of oil daily from Bolivar Coastal fields on Lake Maracaibo to the company's refinery and deep-water terminal at Amuay.

Three big western European refineries damaged by floods whipped up by huricane. Plants hit hardest were Anglo-Iranian's 80,000-bbl. Kent refinery and Vacuum Oil's 20,000-bbl. Coryton refinery in England and Royal Dutch-Shell's 100,000 refinery at Pernis in the Netherlands.

El Paso Natural Gas Co. refiles plans for $175,250,000 expansion of its trunk system from West Texas and New Mexico fields to California. Program would involve construction of 1,778 miles of pipe lines and 161,860 hp. in compressor units.

Hearings on tidelands legislation open in both houses of Congress as opposition forces line up for what congressional leaders hope is the last fight over the issue. Proposed bills number more than 30.

Interior Secretary Douglas McKay approves issuance of block of more than 500 leases covering nearly 1,000,000 acres of Alaskan lands in the

Oil Headlines in '53

Katalla-Yakataga area adjacent to the Gulf of Alaska, thereby paving the way for the first big-scale private development of that U. S. territory's oil resources.

Standard Oil Co. (N.J.) cuts price for Middle East crude at eastern Mediterranean export terminals by 12 cents per barrel due to continued low tanker-freight rates. Other Middle East operators expected to follow suit. Creole Petroleum lowers price for three crudes in Venezuela from 10 to 14 cents per barrel.

Australian company, Associated Australian Oilfields, reported to have found promising oil sands in a test in the Roma district, southern Queensland, of previously oil-barren Australia.

OPS removes price controls on crude oil, all products except No. 2 heating oil, and oil-field equipment and machinery. PAD lifts all federal restrictions on the extension of natural-gas service. Mobilization Director Arthur S. Flemming reveals allocation of steel, copper, and aluminum for the oil and gas industries will be dropped June 30.

Price of crude increased in West Coast and Penn Grade producing regions—the two areas squeezed hardest by the price controls, removed this month. Price hike in California ranges generally from about 10 cents per barrel for 14°-gravity and below to 50 cents for 35°-gravity and above. Most Penn Grade crudes were posted about 15 cents per barrel higher.

Two European refineries damaged by heavy floods earlier this month being returned to operation. All units of Shell's Bataafsche Petroleum Mij. refinery at Pernis in the Netherlands are back in production, while process equipment at Vacuum Oil's Coryton plant on the Thames in England is expected to be functioning by the end of the month.

First oil starts flowing through West Texas Gulf Pipe Line Co.'s new 466-mile, 20 and 26-in. crude trunk from Colorado City, West Texas, to Sour Lake in the Gulf Coast refining area.

Houston operators outline plans for huge natural-gas system which would move gas from South Texas and South Louisiana to St. Louis, Chicago, Detroit, Cleveland, and Philadelphia. Planners (J. O. Mack, H. S. Mack, and Al Kleinkaus) say plans for the system, comprised of two 30-in. lines with a capacity of 900,000,000 cu. ft. daily, will be submitted to FPC within 60 days.

Texas Railroad Commission approves plans for unit-operating agreement calling for injection of gas and water into the San Andres reservoir of Goldsmith field, Ector County, West Texas. Unit takes in 18,240 producing acres with 557 wells. Gulf Oil Corp. named operator.

World's biggest unit operation, the 47,000-producing-acre, secondary-recovery project in Kelly Snyder and Diamond M fields of Scurry County, Texas, goes into effect as of March 1.

Texas Railroad Commission grants authority to Tex Harvey Oil Co. to carry out an experimental water-imbibition displacement test in the Tex Harvey area of the Spraberry in Midland and Glasscock counties, West Texas.

Third Court of Civil Appeals in Austin refuses new hearing on three lawsuits challenging constitutionality of Texas' multimillion-dollar gathering tax on natural-gas pipe-line companies.

NPC committee reports commercial production of synthetic liquid fuels still far in the future. This due to the fact that costs of production are far out of line and that natural petroleum is in plentiful supply, committee says.

Rancho Pipe Line System pumping crude into big-inch line from McCamey, Tex., to Houston in preparation for first deliveries to Houston about the middle of March.

Contract for construction of Evangeline Products System's 16-in. products line between Port Arthur, Tex., and Baton Rouge is let.

PAD allocates pipe for delivery during the first, second, and third quarters for construction of a 236-mile, 8-in. products line by Kaneb Pipe Line Co. from the Wichita-Potwin, Kans., area to Fairmont, Neb. Initial capacity set at 15,000 bbl. daily.

MARCH . . .

Carter Oil Co. reveals what may be most significant development in exploratory geology in many years with announcement that it is now using fossil pollen and spores to determine the age of rocks and to locate the shore lines of ancient seas.

Northwest Natural Gas Co. negotiating with Ontario and Ottawa officials to obtain backing for big new gas line from Alberta to eastern Canada. Company officials say new plan is to be considered in addition to the line already planned from Alberta to the Pacific Northwest and not as a substitute. Route of the line would be roughly parallel to Interprovincial's extended crude system.

Atlantic Refining Co. reveals new secondary-recovery technique, high-pressure gas injection, is recovering up to 52 per cent of the oil in place in its project in University Block 31 field, Crane County, West Texas. Method is regarded as one of the hottest developments ever to come out of a production-research laboratory.

First crude oil to flow through the new Rancho pipe line from West Texas arrives in Houston. The $35,000,000 24-in. line initially is moving 210,000 bbl. daily over the 457-mile route from McCamey, Tex.

Anglo-Iranian Oil Co., Ltd., announces initial operation of its new Kent refinery in England. The 80,000-bbl. plant now is processing at a rate of about 40,000 bbl. daily.

The Navy Department reveals it is abandoning its quest for oil in Alaska after having expended about $45,000,000 since 1944 on an exploration program which has resulted in no commercial discoveries.

Gulf Oil Corp. places world's largest ethylene plant on stream at Port Arthur, Tex. Plant has annual production capacity of 2½ billion cubic feet annually.

Shell Oil Co.'s 1 Weeks-Gall unit in Weeks Island field in Iberia Parish, Louisiana, is completed as the world's deepest oil producer with total depth at 17,183 ft. This depth exceeds by 1,576 ft. that of the previous deep producer, Standard Oil Co. of California's 5 Mushrush in Wasco field, Kern County, California.

Rohm & Haas complete $8,000,000 plant at Houston which uses new continuous catalytic process to make acrylate monomers by reacting acetylene with carbon monoxide and an alcohol.

Standard Oil Development Co. takes wraps off operating details of its new low-cost version of fluid catalytic cracking, the Model IV unit.

Colorado Interstate Gas Co. files with FPC for approval of construction of natural-gas-transmission facilities estimated to cost a total of $43,155,249. Included would be a 365-mile, 22-in.

Oil Headlines in '53

line from a connection with the proposed Pacific Northwest Pipe near Green River, Wyo., to Denver.

I.P.A.A. asks Congress to limit crude and products imports to 10 per cent of United States domestic demand in resolution drafted at a special imports-policy meeting in San Antonio.

Uthmaniaya oil field in Saudi Arabia brought into commercial production for first time producing initially about 100,000 bbl. of oil daily.

Texas Railroad Commission orders production in the huge Spraberry trend of West Texas shut in as of April 1 until flaring of natural gas is halted. Affected by the action is an oil production of about 82,000 bbl. daily on a calendar-day basis and a gas production estimated at 280,000,000 cu. ft. per day. Commission says about 220,000,000 cu. ft. daily of the gas is being flared.

Saskatchewan reveals it will permit export of its gas, provided exporting company guarantees sufficient gas for provincial needs at reasonable rates and insures an adequate share of Canada's total export market for natural gas produced in Saskatchewan.

American Independent Oil Co. reports significant strike in the Saudi Arabia-Kuwait Neutral Zone. The test, the company's sixth try in a $30,000,000 search, tests 2,400 bbl. daily of 31°-gravity crude from the first Burgan sand.

Iranian Government rejects sixth proposal made by British and U. S. for settlement of the oil-nationalization dispute in Iran.

APRIL . . .

More than 80 per cent of sprawling Spraberry trend area, encompassing nearly half a million productive acres and spreading over five West Texas counties, is shut in by order of the Texas Railroad Commission to stop gas flaring. Only operations continuing are those of operators obtaining last-minute District Court restraining order, because they were utilizing all produced gas.

House of Representatives passes by 285-to-108 vote a bill returning the tidelands within historic borders to the states. The measure would give the states power to impose severance or production taxes and to police and enforce conservation laws in the Continental Shelf beyond their borders.

Caltex organization negotiates agreement with India whereby the company will construct a new 10,000-bbl. refinery at Vishakapatnam, a ship-building center in the State of Mardas on the eastern coast. Construction scheduled to begin in early 1955.

Israeli Government grants exploration rights to seven independent firms and groups representing American, Swiss, Canadian, and Israeli capital. Best known of the companies taking out licenses under the new Israeli petroleum law is Husky Oil Co., Cody, Wyo.

Department of Justice reveals it will file civil antitrust suit in the international cartel case instituted last year by the Truman administration.

Monsanto Chemical Co. reveals it is planning construction of huge new petrochemical plant which would manufacture 66,000,000 lb. of polyethylene per year when completed early in 1955 and 100,000,000 lb. when expanded in 1957.

Petroleos Mexicanos announces it is planning construction of a new refinery at Tampico in the State of Tamaulipas to process heavy crude produced in Tenixtepec, Naranjos, and Panuco fields. Pipe line would be laid from the plant to Monterrey.

American Independent's Wafra 4 discovery well in the Kuwait-Saudi Arabia Neutral Zone flows 2,500 bbl. daily in second drill-stem test of First Burgan sand and 2,000 bbl. daily from a second productive sand below the Orbitolina limestone.

Lakehead Pipe Line Co., Inc., lets contracts for 635-mile, 30-in. extension of Interprovincial crude system to eight pipe-line contracting firms. The $76,000,000 project will extend from Superior, Wis., to Sarnia, Ont., 6 miles across the international boundary from Port Huron, Mich.

Shell Oil Co. of Canada officially opens $4,000,000 petrochemical plant at Montreal—the first such plant in Canada to produce isopropyl alcohol and acetone.

Rancho Pipe Line System dedicates new 457-mile, 24-in. crude-oil line from McCamey, in West Texas, to the Houston Ship Channel with formal opening ceremonies at line's three pump stations. Initial capacity is 210,000 bbl. daily.

Interior Department abandons as unprofitable its demonstration of the production of synthetic gasoline from coal at Louisiana, Mo., after more than 5 years of operation and costs to the Government of about $75,000,000.

Eisenhower asks Congress to enact legislation enabling the Government to sell its synthetic-rubber plants as recommended by Reconstruction Finance Corp.

Australian Oil Refining, Ltd., a Caltex subsidiary, begins construction work on new 22,000-bbl. refinery at Kurnell, Botany Bay, New South Wales, Australia. Plant estimated to cost about $56,500,000.

Texas Illinois Natural Gas Pipeline Co. gets approval of Federal Power Commission to boost capacity of its natural-gas-transmission system to the Chicago area 130,000,000 cu. ft. daily to a new total of 504,000,000 cu. ft. daily.

Sinclair Pipe Line Co. holds formal dedication ceremonies at Cushing, Okla., observing completion of its new 670-mile, big-inch crude-oil line from the Cushing area to East Chicago, Ind. The 24 and 22-in. project cost approximately $52,000,000.

Court fight opens at Austin, Tex., to determine whether all oil operations in West Texas' Spraberry Trend Area field will be halted or whether those in which no gas is flared may continue on production.

Sun Oil Co. and Phillips Petroleum Co., in deepest test ever drilled in Montana, the 1 Dynneson in Richland County, find oil in Ordovician at 12,591-12,637 ft. Indicated discovery is 45 miles east of Williston basin producing areas of eastern Montana and about 70 miles southwest of Beaver Lodge field in North Dakota.

Sinclair Refining Co. announces new catalytic reforming process employing fixed-bed and platinum catalyst developed by Sinclair research laboratories and Baker & Co., Inc. First commercial unit, a 16,000-bbl. plant, to be installed at Sinclair's big Marcus Hook, Pa., refinery by C. F. Braun & Co.

Department of Justice files civil suit in District of Columbia Federal Court charging five major oil companies in so-called cartel case with conspiracy to violate the antitrust laws. Defendants are Standard Oil Co. (N.J.), Socony-Vacuum Oil Co., Inc., Standard Oil Co. of California, The Texas Co., and Gulf Oil Corp.

this new book answers:

HOW MUCH CAN YOU SAVE WITH A LJUNGSTROM?

You save up to 20% of your fuel costs alone on process units, for example. The Ljungstrom Air Preheater recaptures waste heat from stack gases and returns it to the furnace, thus reducing the quantity of fuel you need to maintain throughput. *There are three other cash advantages* with Ljungstrom, too. *Throughput increases* up to 25% . . . *octane rating increases* as much as two points . . . *maintenance costs are reduced* because of much lower rate of slag formation on furnace tubes. You'll find confirming details on these great savings – and more – in this book just published by The Air Preheater Corporation. Just ask for Catalog L-2.

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Oil Headlines in '53

MAY . . .

District Court in Austin makes permanent a previous temporary injunction permitting operators not now flaring gas in Spraberry Trend Area field of West Texas to continue producing operations. Texas Railroad Commission annuonces intention of appealing to the state Supreme Court.

FPC permits Northern Natural Gas Co. to divorce itself of its gas-producing properties in a decision which it is believed may mark a turning point away from a policy of attempting to extend FPC jurisdiction to production and gathering of natural gas and regulation of producing activities of interstate pipe lines.

Truman-instigated grand jury investigation of alleged international oil cartel is dropped by Department of Justice in the "interest of national security."

Iran offers to sell crude oil and products from the nationalized properties of Anglo-Iranian Oil Co., Ltd., at half the prevailing Persian Gulf price to any dollar buyers for next 6 months.

Platte Pipe Line Co. begins construction of new $3,000,000 extension of its system into the Big Horn basin of Wyoming.

Largest crude-oil pipe line in North America, West Texas Gulf Pipe Line Co.'s 466-mile, 26-in. carrier from West Texas to the Houston refining area on the Gulf Coast, is officially dedicated. Ultimate capacity is 410,000 bbl. daily.

Texas Supreme Court upholds constitutionality of the state's controversial natural-gas-gathering tax in effect by refusing to review Circuit Court of Appeals decision. Way is paved for companies to appeal to U. S. Supreme Court.

Sinclair Oil & Gas acquires 4,274 net producing acres in Benedum pool of Upton and Reagan counties, West Texas, with current production of 2,100 bbl. daily from Slick-Urschel Oil Co. and Hewgley Drilling Co.

Senate passes by vote of 56 to 35 the Holland bill restoring to coastal states the submerged lands within their seaward boundaries. All amendments to weaken bill decisively rejected.

International Refineries, Inc., places new $7,000,000 refinery on stream at Wrenshall, Minn., near Duluth. Refinery is charging Canadian crude supplied under 10-year contract with Interprovincial Pipeline Co.

FPC approves huge $100,000,000 construction program involving installation of new natural-gas-transmission facilities by Permian Basin Pipeline Co., Northern Natural Gas Co., and El Paso Natural Gas Co., and including new big-inch outlet for gas in Spraberry trend area.

Brief formal ceremonies kick off mammoth 1953 oil show in Tulsa, the biggest and most expensive in the 30-year history of the International Petroleum Exposition. Exhibitors, numbering more than 1,480, show equipment valued at approximately $100,000,000.

Socony-Vacuum Oil Co., Inc., announces new, lower-cost process, termed Thermofor Continuous Percolation, for decolorizing lube stocks and waxes. Company spokesmen reveal two commercial units will be installed at refineries in England and Holland.

Shell Oil Co., supplies 16 cities in the United States with its new gasoline additive, TCP, hailed by the company as the biggest development in motor fuel since the introduction of tetraethyl lead.

Huge 1953 edition of International Petroleum Exposition closes, shattering all previous records for attendance and sales of equipment during its 10-day run. Average daily attendance falls just shy of the 40,000 mark.

Belgian company, Petrofina, organizes new Canadian subsidiary to build refinery in Quebec. Authorized capital is $25,000,000, a major part of it reserved for the Canadian public.

Sun Oil Co. lets contract for construction of its 200-mile, 8-in. products line from Sarnia, Ont., to Toronto to William Bros. Pipe Line Contracting Co., Ltd., of Toronto.

Argentine oil agency reports prolific new oil strike at Madre Jones in Salta Province near the Bolivian border. Discovery reported to be producing about 3,150 bbl. of light crude daily and about 1,000,000 cu. ft. daily of gas.

Federal Power Commission issues certificate approving construction by Gulf Interstate Gas Co. of the first major natural-gas carrier to operate on a fee basis—a huge 860-mile, 30-in. transmission line from Acadia Parish, Louisiana, to Boyd County, Kentucky. Gas will be carried for the account of United Fuel Gas Co., Charleston, W. Va., a subsidiary of Columbia Gas System.

Standard Oil Co. (Ind.) places in operation its new 309-mile, 12-in. products line from Sugar Creek, Mo., to Dubuque, Iowa, carrying initially about 40,000 bbl. of products daily.

President Eisenhower signs tidelands bill returning to coastal states the title to submerged lands out to 3 miles except in the cases of Texas and Florida where historic boundaries are 10½ miles out.

Final organization of 12 companies to carry out what is reported to be the country's deepest water-flood project, some 11,000 ft., is completed. The project will take place in North Lindsey pool of McClain County, Oklahoma, where 2,800,000 bbl. of oil had been produced as of April 1.

Circuit Court of Appeals upsets the decision of the Federal Power Commission that Phillips Petroleum Co. is not a natural-gas company under the Natural Gas Act and is exempt from FPC rate-making authority. Decision affects some 2,000 gas producers, gatherers, and distributors who would automatically come under FPC authority if ruling stands. Phillips officials plan appeal to the Supreme Court.

Contract for North Dakota's first crude-oil pipe-line outlet is let by Service Pipe Line Co. to O. R. Burden Construction Corp., Tulsa. The 160-mile project will connect Tioga and Beaver Lodge fields with the new Standard Oil Co. (Ind.) refinery in Mandan.

A new wholly owned subsidiary of Royal Dutch-Shell Group is organized in Canada under the name Canadian Shell, Ltd. It is capitalized at $200,000,000.

Becoming one of the first American companies to resume operations in Egypt, Southern California Petroleum Corp. signs agreement with International Egyptian Oil Co., Inc., to supervise exploration and development on the latter's concessions on Sinai Peninsula.

JUNE . . .

Congress extends Reciprocal Trade Agreements Act without adding restrictions.

Defense Department approves plan under which oil companies operating overseas may cooperate to deal with

shortages without fear of antitrust prosecution.

District Court in Denver upholds Colorado Oil and Gas Conservation Commission order stopping gas flaring in Rangely field.

Texas Supreme Court strikes down Texas Railroad Commission's order shutting down Spraberry field. The court holds that the commission may not shut down nonwasteful operators to protect correlative rights of those operators wasting gas.

Navy Department closes down Alaskan oil camps.

Sinclair Pipe Line Co. signs contract to sell 1,600 miles of its old 8, 10, and 12-in. pipe and 14 pump stations to River Construction Corp., Mid-States Pipe & Supply Co., and Rogers & Wright, Inc. Removal and salvage of the 170,000 tons of materials are expected to take 3 years.

Crude prices throughout nation, excluding California and Pennsylvania, jump 25 cents a barrel, after Phillips Petroleum Co. initiates increase. Companies say price boost needed to cover rising costs of exploration.

First shipload of equipment need by Kerr-McGee Oil Industries, Inc., and Phillips Petroleum Co. in their joint exploration of 1,000,000 acres in Alaska, leaves Seattle.

Senate studies bill setting up machinery for federal administration of outer Continental Shelf. Legislation contains no provision for participation of states in either management or revenue.

Creole Petroleum Corp. raises its higher-gravity crudes 25 cents marking first break in foreign crude prices.

Senate passes bill setting up federal administration of outer Continental Shelf with abutting states' tax laws governing area but revenue going into the national treasury.

JULY . . .

Major oil companies initiate 4 per cent general wage boost for all employes.

Federal Power Commission approves El Paso Natural Gas Co.'s application to increase capacity of its transmission system from Texas through New Mexico to California by 400,000,000 cu. ft. daily. Also, FPC approves construction by three California companies of $34,000,000 in facilities to receive the gas in California.

North Atlantic Treaty Organization lets contract to Foster Wheeler Corp. for construction of 1,920 miles of products lines to supply some 100 western Europe air bases.

Royalite Oil Co., Ltd., begins construction on its 5,000-bbl. per day refinery at Kamloops, B. C., which will process crude transported by Trans Mountain Pipe Line from Redwater field, Alberta.

Hydrocarbon extraction and fractionation units begin processing natural gas at National Petro-Chemicals Corp.'s huge $44,000,000 center now under construction at Tuscola, Ill.

Arkansas files suit in federal court testing constitutionality of tidelands "quitclaim" law. Seeks to prevent the Government turning back to coastal states submerged lands within their historic borders.

Gulf Exploration Co. raises price of Kuwait crude oil 25 cents a barrel, giving first break in Middle East crude prices.

Products Pipeline Co., a division of Standard Oil Co. (Ind.), begins construction on 207-mile products line from Mandan, N. D., to Moorhead, Minn.

Backers of the proposed 540-mile, 10-in. products line from Billings, Mont., to Spokane, Wash., place Continental Pipe Line Co. in charge of construction. Continental will operate through the staff of the newly formed Yellowstone Pipe Line Co., which is owned by the backers of the products line. These are Continental Oil Co., Interstate Oil Pipeline Co., Union Oil Co. of California, and the H. Earl Clack interests.

Independent refiners testify before Wolverton committee that charges of collusion against big companies in raising crude prices are untrue. Also they echo testimony of previous defense witnesses that price hike was needed to cover rising costs and encourage development.

Caribbean Refining Co. announces plans to build a 10,000-bbl. per day refinery near San Juan, Puerto Rico.

Pacific Northwest Pipeline Co. renews its contract with Phillips Petroleum Corp. for natural-gas reserves in the San Juan basin. Also, the company contracts with General Petroleum Corp. for 35,000,000 cu. ft. of gas in Rio Blanco County, Colorado, and Sublette County, Wyoming. These reserves are located on a proposed gas line to Washington and Oregon.

The Texas Railroad Commission separates the Benedum Spraberry area from Spraberry Trend Area field of West Texas. The field's allowable will be based on the regular state-wide 21-day pattern.

Mathieson Chemical Corp. completes the first large-scale plant in this country for the manufacture of hydrazine at Lake Charles, La. The $2,000,000 plant will sell the chemical for $2.50 per pound, in sharp contrast to the price of $50 per pound a few years ago.

Deep Rock Oil Corp. places $2,500,000 solvent lubricating-oil plant in operation at Cushing, Okla. The new facilities utilize phenol-treating and propane-deasphalting processes.

Eighth Circuit of Appeals, St. Louis, rules in the case of Northern Natural Gas Co. that minimum field price for natural gas in Hugoton field prescribed by the Kansas Corporation Commission does not apply to gas produced by an interstate pipe-line company.

Construction starts on Kaneb Pipe Line Co.'s new 246-mile, 10 and 8-in. products line from Wichita to Fairmont, Neb., and Augusta Pipe Line Co.'s new 43-mile, 8-in. products carrier from Arkansas City to Augusta, Kans. The new system will serve over six refineries in the area when it is completed October 1.

Imperial Oil, Ltd., raised price of Alberta crude to 26 cents per barrel, reflecting the recent price increase in the United States.

Esso Export Corp., Mid-East Crude Sales Co., Ltd., and Shell increase Middle East crude prices following recent increases by Gulf Exploration Co. and Anglo-Iranian Oil Co., Ltd.

AUGUST . . .

Work begins on the new Standard Oil Co. (Ind.) 10 and 20-in. products line from Whiting, Ind., to River Rouge, Mich., a distance of 238 miles.

Lakehead Pipe Line Co. begins laying two 20-in. crude lines across the Straits of Mackinac as a part of the company's 644-mile project from Superior, Wis., to Sarnia, Ont., Canada.

Oil Headlines in '53

Claimed to be the deepest and most costly underwater crossing ever attempted, the lines will be laid at a depth of 230 ft. for a distance of some 12,000 ft.

Superior Court in Fresno, Calif., opens hearings on charges brought by the state against 12 operators in Coalinga Nose field, San Joaquin County, for alleged natural-gas wastage.

The House votes against the Simpson bill, killing any chance of placing restrictions on imports during this session of Congress.

House and Senate conferees reach an agreement on a bill providing for federal administration of submerged oil lands beyond state boundaries. The group decides to discard the controversal Hill amendment which would earmark the revenue for education.

Middle East crude-price increases level off at 22 cents a barrel in the Persian Gulf area, and 10 cents a barrel in the eastern Mediterranean.

Rubarite, Inc., a newly formed firm, announces development of rubber additive which will improve asphalt. The company is producing the new commodity at a new plant in Magnet Cove, Ark.

Texas Eastern Transmission Corp. and Wilcox Trend Gathering System, Inc., complete a 452-mile interconnecting natural-gas system from Hagist Ranch field in Texas to Castor, La.

Platte Pipe Line Co. opens new 1,149-mile crude-oil line from western Wyoming to Wood River, Ill. The new line will deliver 150,000 bbl. daily of Rocky Mountain crudes to Midwest refineries.

Pioneer Pipe Line Co. dedicates new 290-mile products line linking Sinclair Refining Co.'s Wyoming refinery with Salt Lake City.

Superior Court orders 27 wells in Coalinga Nose field near Fresno, Calif., shut in due to gas wastage.

Stanolind Oil & Gas Co.'s Brownsville, Tex., chemical plant closes due to lack of feed stock which was being supplied by the closed Carthage Hydrocol plant.

Standard Oil Development Co. announces new fluid coking process is ready for commercial use. Carter Oil Co. expects to install first unit at its Billings, Mont., refinery.

United States and Canadian governments approve plans for construction of a 600-mile products line from Haines to Fairbanks, Alaska. The $40,000,000, 8-in. line will run from Haines through British Columbia and into Fairbanks along the Alaska Highway.

Federal Power Commission approves compromise offer dividing New England natural-gas market between Algonquin Gas Transmission Co. and Northeastern Gas Transmission Co.

Utah Chemical Co., Salt Lake City, plans to build $18,500,000 synthetic anhydrous ammonia plant near Clear Creek gas field in Sanpete County, Utah.

Scurry Area Canyon Reef Operators Committee files briefs with Texas Railroad Commission on field rules for world's largest water-flood project.

Texas Gas Transmission Corp. completes last segment of 408-mile natural-gas line running from Bastrop, La., to Owensboro, Ky.

SEPTEMBER . . .

Federal Power Commission authorizes Tennessee Gas Transmission Co. to export about 115,600,000 cu. ft. of natural gas daily to Canada, near Niagara Falls for delivery to the Toronto area over a proposed $7,000,000 pipe line. Also, Tennessee Gas will lay about 904 miles of line to transport the gas from the Southwest to the border.

Discovery of oil in the Black Warrior basin of northeastern Mississippi and northwestern Alabama sets off wave of leasing activity.

Continental Pipe Line Co. seeks new bids on construction of the 540-mile Yellowstone products line from Billings, Mont., to Spokane, Wash.

Algonquin Gas Transmission Co. begins delivering natural-gas to New England markets after 2½ years of costly court fights and Federal Power Commission hearings.

Anglo-Iranian Oil Co., Ltd., begins erecting plant units at the Aden refinery, largest in the world now under construction.

The eastern terminal of the 711-mile Trans-Mountain crude line is dedicated at Edmonton, Alta., with only 12 miles of pipe remaining to be laid near the western terminus at Vancouver, B. C.

The Alberta Petroleum and Natural Gas Conservation Board grants Trans-Canada Pipe Lines, Ltd., permission to export gas to eastern Canada.

Phillips Petroleum Co. becomes thirtieth company in United States to have over 1 billion dollars in assets.

Interior Department gives operators holding state leases on the outer Continental Shelf off Texas permission to start exploration and development projects.

Pennsylvania Grade crudes cut 50 cents a barrel.

OCTOBER . . .

Surplus stock buildup causes October allowables to be cut sharply in Texas, Oklahoma, and Kansas. The latter orders 10-day shutdown of 80 per cent of state's wells.

National Petroleum Council voices opposition to the Government's proposal for a 36-in. crude line running from the Texas Gulf Coast to the East Coast.

Interior Department issues regulations governing transfer of state leases on the outer Continental Shelf for federal grants.

The Texas Co. and Gulf Oil Corp. announce the development of new motor oils which will combat engine deposits and preignition. Also, Cities Service Oil Co. begins marketing new gasoline designed to fight preignition.

Dedication ceremonies open Trans Mountain Oil Pipe Line Co.'s 718-mile, 24-in. crude line from Edmonton, Alta., to Vancouver, B. C.

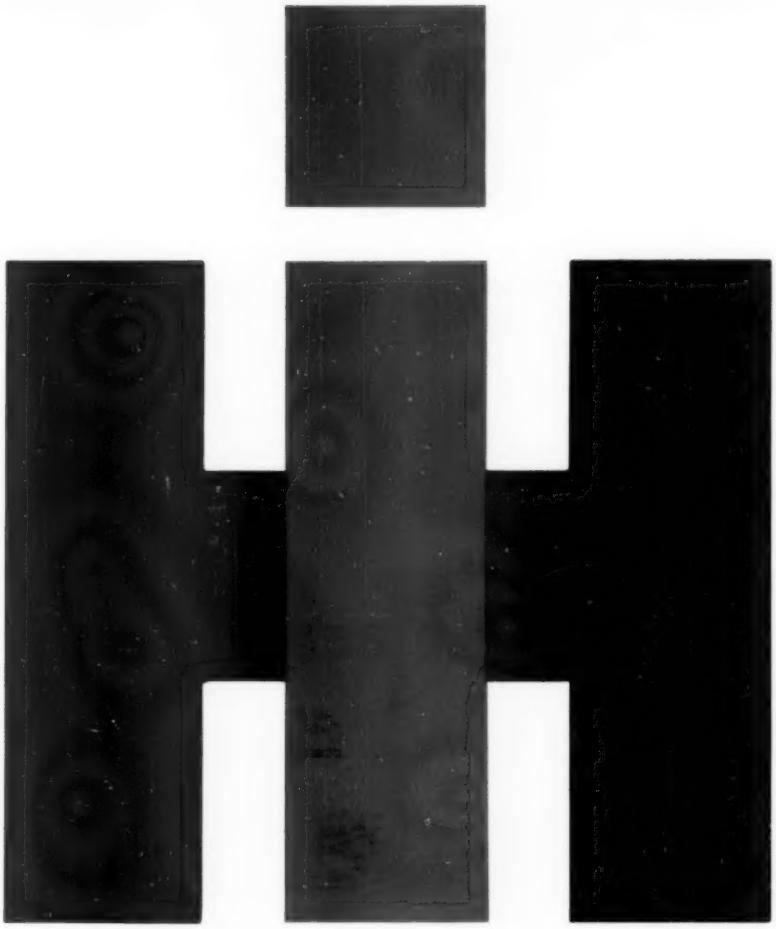
Dow Chemical Co. dedicates new research center at Freeport, Tex. The new center is for the Organic and Technical Research groups of Dow's Texas Division.

Evangeline Pipe Line System's 191-mile, 16-in. products line extending from Port Arthur, Tex., to Baton Rouge goes into operation.

Kuwait Oil Co., Ltd., places world's largest crude line, 34-in., in operation on Persian Gulf.

Shell Oil Co. completes the world's deepest producer at Weeks Island field in Iberia Parish, Louisiana. The well

(Continued on page 207)



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Now a complete earthmoving line that comes in the

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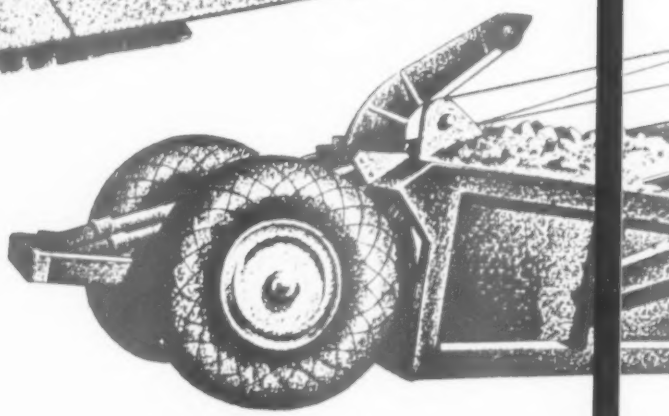

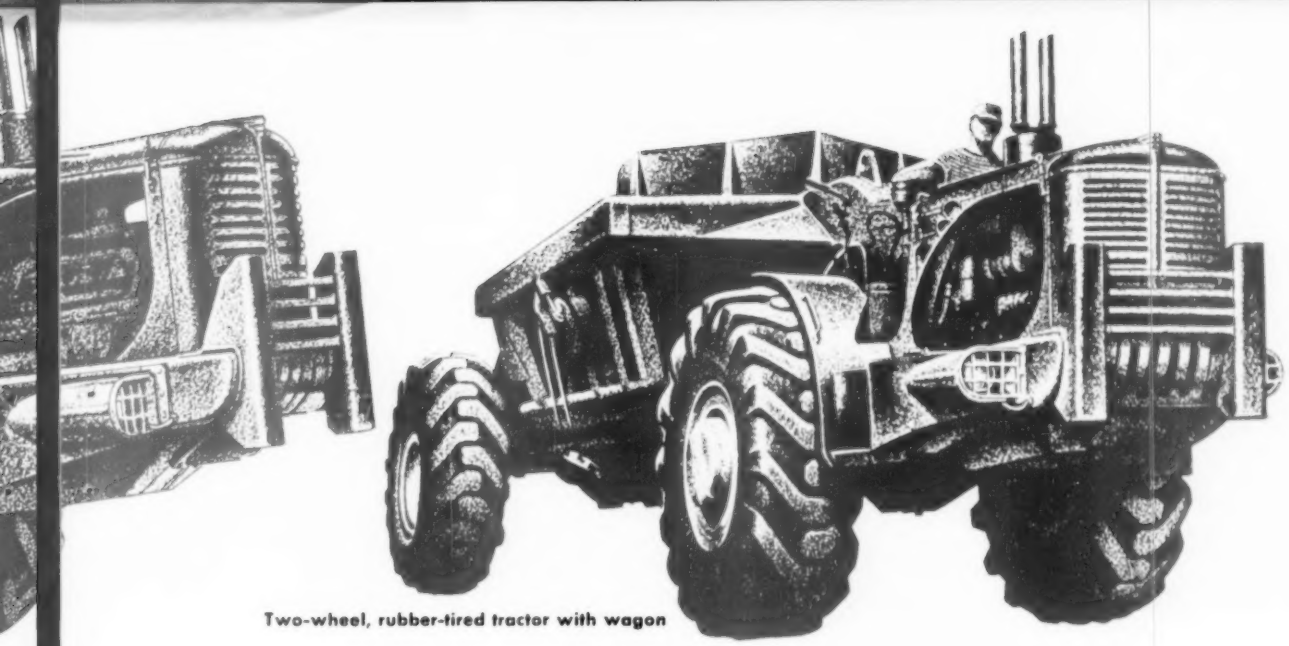

Two-wheel, rubber-tired tractor with wagon

Big Red Package

Got a big job to do? Call on INTERNATIONAL'S new Big Red Team!

- Seven rugged crawlers headed by the TD-24—most powerful crawler on the market!
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- Four 4-wheeled scrapers!
- Two high-speed, two-wheel, rubber-tired tractors with scrapers (13 and 18 heaped-yard capacity)!
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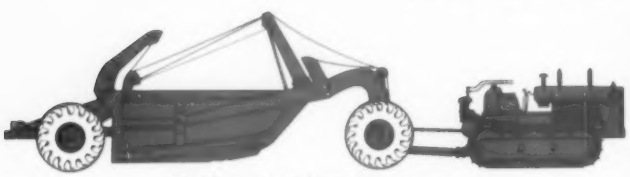
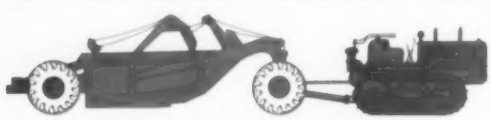
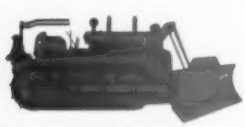


TD-24 crawler with matched scrapers



TD-18A crawler with matched scrapers



TD-24 crawler with bullgrader

TD-14A crawler with cable bullgrader

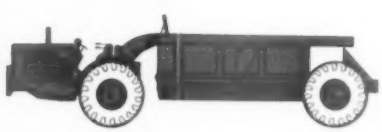
TD-9 crawler with hydraulic bulldozer

T-9 crawler with hydraulic bullgrader

TD-6 crawler with hydraulic bulldozer

T-6 crawler with hydraulic bullgrader

Model 2T-75 two-wheel, rubber-tired tractor with 18 heaped-yard capacity scraper



Model 2T-75 two-wheel, rubber-tired tractor with 20 heaped-yard capacity bottom dump wagon

Model 2T-55 two-wheel, rubber-tired tractor with 13 heaped-yard capacity scraper

is producing 200 ft. lower than the former depth-record producer, which belongs to Shell, through perforations from 17,260-17,306 ft.

Independent Petroleum Association of America at its annual convention unanimously adopts a resolution requesting (1) importing companies to limit imports to 10 per cent of the domestic demand; (2) the President of the United States to enlist the cooperation of the whole industry and use all his authority to solve the problem; and (3) federal legislation if all other attempts fail.

Commercial Solvent Corp. completes $20,000,000 ammonia plant at Sterlington, La., boosting the company's ammonia production by 70,000 tons and its methanol output to 30,000,000 gal. a year.

International Pipe Line, Inc., plans 132-mile, 8-in. products line from the new 11,500-bbl. International Refineries, Inc., refinery at Wrenshall, Minn., to Minneapolis.

Sinclair Refining Co. places new units on stream at its Houston refinery increasing the installation's crude-charging capacity from 90,000 to 125,000 bbl. per day. New facilities of the $35,000,000 expansion project include a 50,000-bbl. fluid catalytic cracking unit and 62,000-bbl. crude and vacuum still.

NOVEMBER . . .

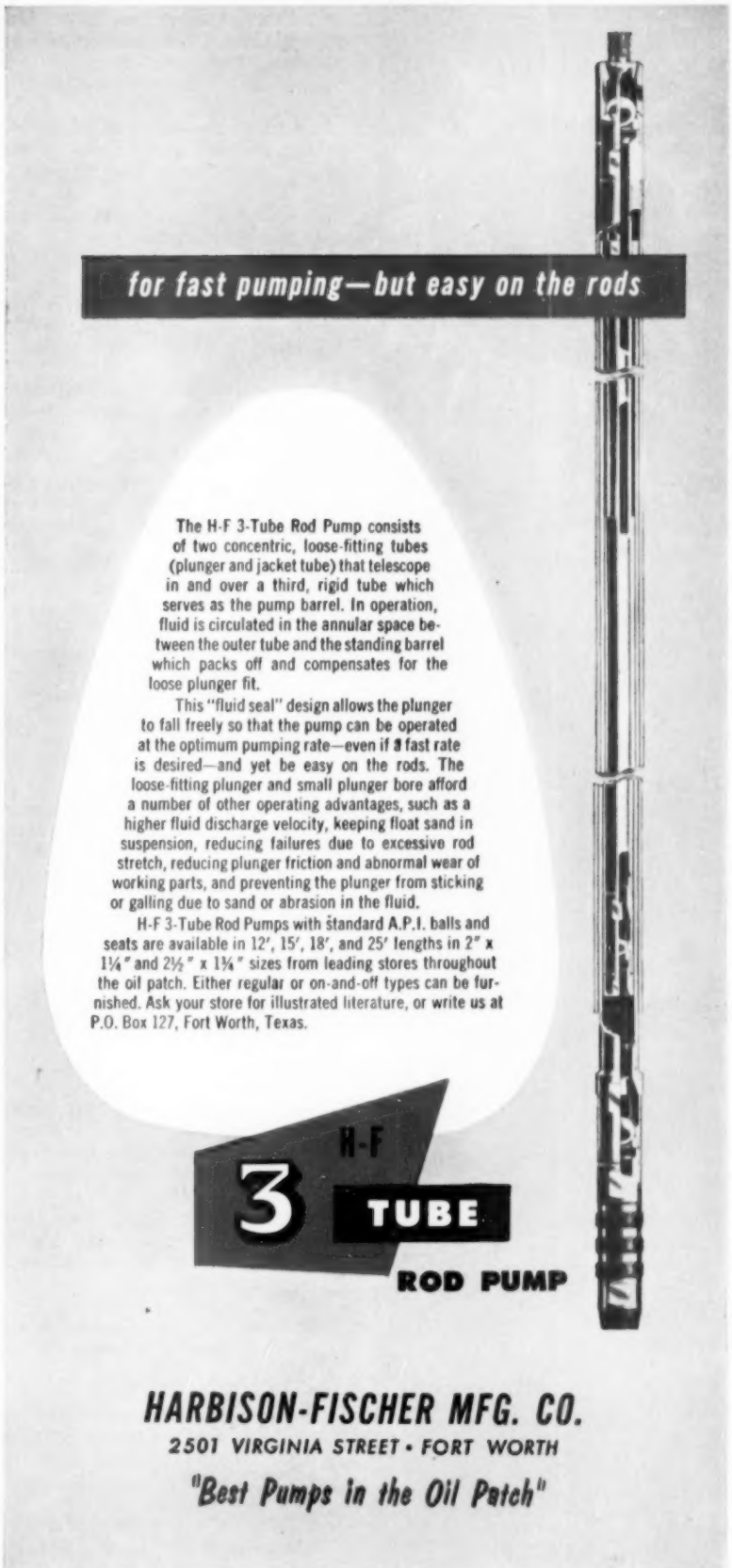
Buckeye Pipe Line Co. opens its 368-mile products line which extends from Linden, N. J., through eastern Pennsylvania to Rochester and Syracuse, N. Y.

Standard Oil Co. (Ind.) begins making deliveries over its new 207-mile, 10-in. products line extending from Moorhead, Minn., to Mandan, N. D.

International Refineries, Inc., dedicates its new 11,500-bbl. refinery at Wrenshall, Minn.

All owners in the huge $50,000,000 Carthage Hydrocol, Inc., gas-synthesis plant at Brownsville, Tex., write off their investment and turn the installation back to Reconstruction Finance Corp. for resale. Stanolind Oil & Gas Co. is considered to be most interested buyer of the facilities.

Tennessee Gas Transmission Co. plans $45,000,000 expansion program which will increase delivery capacity


for fast pumping—but easy on the rods
The H-F 3-Tube Rod Pump consists of two concentric, loose-fitting tubes (plunger and jacket tube) that telescope in and over a third, rigid tube which serves as the pump barrel. In operation, fluid is circulated in the annular space between the outer tube and the standing barrel which packs off and compensates for the loose plunger fit.
This "fluid seal" design allows the plunger to fall freely so that the pump can be operated at the optimum pumping rate—even if a fast rate is desired—and yet be easy on the rods. The loose-fitting plunger and small plunger bore afford a number of other operating advantages, such as a higher fluid discharge velocity, keeping float sand in suspension, reducing failures due to excessive rod stretch, reducing plunger friction and abnormal wear of working parts, and preventing the plunger from sticking or galling due to sand or abrasion in the fluid.
H-F 3-Tube Rod Pumps with standard A.P.I. balls and seats are available in 12', 15', 18', and 25' lengths in 2" x 1¼" and 2½" x 1¾" sizes from leading stores throughout the oil patch. Either regular or on-and-off types can be furnished. Ask your store for illustrated literature, or write us at P.O. Box 127, Fort Worth, Texas.
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HARBISON-FISCHER MFG. CO.
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"Best Pumps in the Oil Patch"

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to 2.1 billion cubic feet daily. Most of expenditure will be for proposed 243-mile, 24-in. line from northern Pennsylvania to New York City.

Contracts awarded for construction of the proposed 610-mile, 8-in. military products line in Alaska.

Lakehead Pipe Line Co. completes 645-mile, 30-in. crude line from Superior, Wis., to Sarnia, Ont.

National Petro-Chemicals Corp. opens its new $50,000,000 Tuscola, Ill., plant.

Government puts 25 synthetic rubber and two butadiene plants up for sale.

Caltex (Philippines) Inc., an affiliate of the Caltex Group, starts construction on a 13,000-bbl. refinery in the Philippines, the first to be built in that country.

Transcontinental Gas Pipe Line Corp. announces plans for $80,000,000 expansion program in the New York-New Jersey-Philadelphia metropolitan area. Plans call for 533 miles of 30 and 34-in. loops on its Texas-to-New York gas line, and additional compressor stations giving the system a boost of 130,000,000 cu. ft. daily.

The newly formed North Dakota Natural Gas Transmission Co. plans to build the first transmission line in North Dakota which will transport gas throughout the state from Tioga and Beaver Lodge fields. Plans call for the system to have 500 miles of 12, 10, and 8-in. pipe.

DECEMBER . . .

U. S. Supreme Court refuses to review Court of Appeals ruling in Phillips Petroleum Co. case that Federal Power Commission has jurisdiction over sales to interstate transmission lines from natural-gasoline plants.

Williams Brothers Co., Tulsa, starts clearing right-of-way for military's 610-mile, 8-in. products from Haines to Fairbanks, Alaska.

Sun Oil Co., Ltd., places its new 15,000-bbl. refinery at Sarnia, Ont., on stream.

Union Oil Co. lets construction contract for a new 15,750-bbl. Unifiner at the company's Oleum, Calif., refinery.

Sun Oil Co. opens new $15,000,000 aromatics plant at Marcus Hook, Pa. The new plant, which employs the first Houdriformer to go into production, turns out benzene, toluene, and mixed xylenes.

National Petroleum Council holds final meeting and recommends that the Oil and Gas Division of the Interior Department succeed the Petroleum Administration for Defense, which is being liquidated.

Federal Power Commission authorizes construction and operational changes in the $100,000,000 pipe-line project to transmit Southwest gas to the Midwest being built by El Paso Natural Gas Co., Northern Natural Gas Co., and Permian Basin Pipe Line Co.

Shell Pipe Line Corp. is named by 12 Williston basin operators to study possible routes, markets, and costs of a big-inch pipe line for the basin's crude.

Shell Chemical Corp. opens new $10,000,000 synthetic anhydrous ammonia plant near Ventura, Calif.

Great Northern Oil Co. plans to construct a refinery in the Twin Cities area of Minnesota. The new facilities, which are expected to be in operation by the fall of 1955, will process 20,000 to 25,000 bbl. of crude from Saskatchewan and probably the Williston basin.

Lakehead Pipe Line Co. begins transporting Alberta crude through its new 645-mile, 30-in. line to Sarnia, Ont. The line, an extension of Interprovincial Pipe Line Co.'s U. S.-Canadian crude system, runs from Superior, Wis., to Sarnia.

A turbine-electric locomotive completes over 50,000 miles of operations using propane. The locomotive, property of Union Pacific Railroad Co., at Los Angeles, is the first of its type to operate successfully on the natural-gas byproduct.

Richfield Oil Co. finds the world's deepest production at depths of 17,500-17,895 ft. near Bakersfield, Calif. The North Coles Levee field test is located 10 miles from the deepest well ever drilled.

U. S. Supreme Court opens arguments on the constitutionality of a Texas tax on natural gas gathered in that state and exported to 38 other states.

The U. S. Army Corps of Engineers receives six bids totaling $61,427,207 for purchase or lease of the Quartermaster Experimental Fuels Station near Louisiana, Mo.

WICHITA 24" *Air-Tube* Clutches Disengage in

1/27 of a second

SMALLER CLUTCHES EVEN FASTER!

For complete safety of the operator, split second disengagement is absolutely *essential!* The amazing disengagement speed of Wichita Air-Tube Clutches is due to minimum volume of air in tube and to Wichita Quick Release Valves.

Wichita Clutches are operating successfully, on many types of equipment, all over the world and *NOT ONE HAS BEEN REMOVED*. This alone proves the superior performance of Wichita Clutches. Test a Wichita . . . you'll see for yourself!

Other Major Features

- **Soft, Smooth Engagement**
- **Simple Design**
- **Efficiency Engineered**
- **Positively Ventilated for Cooler Operation**
- **Extremely Long Life**
- **Easier Maintenance**

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Frank W. Yarline Co., Chicago, Ill.
Power Rig & Equipment Co., Inc., Long Beach, Calif.

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Production and Proved Remaining Reserves—By Fields

On this and the following several pages are estimates of proved remaining reserves of crude oil, condensate, and cycled products for the country's larger producing fields. Fields with an estimated ultimate recovery of 100 million barrels or more are flagged by asterisks.

PRODUCTION AND RESERVES—APPALACHIAN

(In thousands of barrels)

PENNSYLVANIA-NEW YORK

	1953 production	January 1, 1954 Cumulative	January 1, 1954 Estimated reserves	January 1, 1954 No. of wells
*Allegany	2,869	144,523	40,477	
*Bradford	9,324	564,515	92,485	

PRODUCTION AND RESERVES—ARKANSAS

(In thousands of barrels)

Atlanta	639	15,154	9,846	46
Buckner	655	11,108	11,892	53
Cairo	522	3,179	4,821	17
Dorcheat-Macedonia	863	16,706	8,294	64
El Dorado, East	1,072	12,337	2,663	187
Fouke	1,371	10,724	5,276	88
*Magnolia	4,082	76,641	59,359	117
McKamie	1,300	14,617	15,383	36
Midway	2,580	30,011	44,989	46
*Schuler	2,035	71,318	28,682	92
*Smackover	3,941	438,374	51,626	1,511
Stephens	1,219	24,802	11,198	424
Urbana	596	12,392	5,608	249
Village	851	15,141	8,859	87
Wesson	3,347	22,469	27,531	156

PRODUCTION AND RESERVES—CALIFORNIA

(In thousands of barrels)

COASTAL REGION

Aliso Canyon	2,662	18,797	21,203	84
Bardsdale	566	5,834	4,166	93
Capitan	491	15,943	6,057	68
Castaic Hills	1,512	2,632	11,368	47
Castaic Junction	850	1,675	5,325	20
*Cat Canyon, West	6,971	65,669	64,331	280
Del Valle	1,000	17,107	12,893	83
*Elwood	1,567	93,252	11,748	62
Gato Ridge	1,014	20,696	9,304	44
Guadalupe	761	1,380	18,620	33
Honor Rancho	1,425	2,900	13,100	17
Lompoc	1,698	24,115	15,885	104
Newhall-Potrero	3,306	31,922	28,078	100
Oak Canyon	466	6,396	5,604	20
Oakridge	1,234	1,422	13,578	32
Olivera Canyon	377	1,204	2,796	12
*Orcutt	1,360	114,821	15,179	268
Oxnard	601	4,989	5,011	18
Placerita	2,768	21,223	23,777	328
Ramona	1,052	11,738	13,262	122
Rincon	3,185	49,262	35,738	222
*San Ardo	11,159	22,940	77,060	425
San Miguelito	2,722	34,676	45,324	114
*Santa Maria Valley	4,192	114,270	45,730	420
South Mountain	4,585	44,575	35,425	310
Tapo Canyon, South	961	961	3,039	17
Torrey Canyon	896	7,119	12,881	58
*Ventura	30,365	478,475	271,525	939
Zaca Creek	1,657	7,068	17,932	39

LOS ANGELES BASIN

*Brea-Olinda	8,625	228,667	101,333	532
*Coyote, East	2,670	67,788	32,212	255
*Coyote, West	2,984	178,806	51,194	330
*Dominguez	3,670	199,301	45,699	346
*Huntington Beach	21,167	523,913	201,087	1,446

LOS ANGELES BASIN (Continued)

	1953 production	January 1, 1954 Cumulative	January 1, 1954 Estimated reserves	January 1, 1954 No. of wells
*Inglewood	4,949	189,704	60,296	457
*Long Beach	7,434	773,777	76,223	1,148
*Montebello	1,766	161,224	23,776	330
Newport, West	1,548	16,113	23,887	227
Playa Del Rey	546	56,792	5,208	105
*Richfield	2,605	121,772	28,228	398
Rosecrans	1,477	71,665	18,335	223
Sansinena	2,812	6,484	28,516	75
*Santa Fe Springs	5,337	549,181	60,819	581
*Seal Beach	3,856	134,578	40,422	234
*Torrance	2,561	138,350	31,650	768
*Wilmington	44,334	650,286	389,714	2,539

SAN JOAQUIN VALLEY

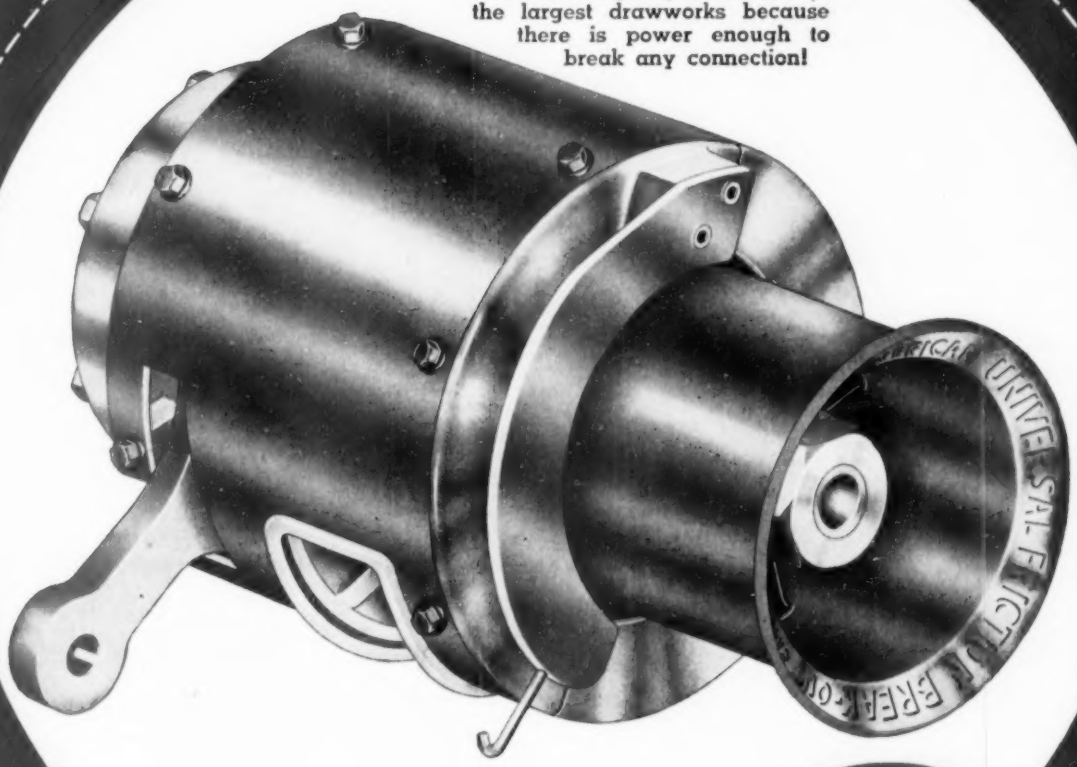
Antelope Hills	414	5,762	4,238	36
Antelope Hills, North	440	1,372	4,628	22
Belgian Anticline	3,465	7,574	17,426	63
Belridge, North	537	61,806	8,194	69
Belridge, South	3,032	56,219	33,781	796
*Buena Vista	8,853	431,714	128,286	1,010
Canal	460	16,753	6,247	29
*Coalinga, Eastside	5,677	292,801	67,199	867
Coalinga, Northeast	436	34,381	7,619	35
*Coalinga Nose	16,507	217,258	182,742	116
*Coalinga, Westside	2,550	173,761	26,239	810
Coffee Canyon	359	15,466	4,534	85
*Coles Levee, North	5,627	73,072	76,928	140
Coles Levee, South	2,142	26,061	33,939	40
*Cuyama, South	12,770	50,518	124,482	232
*Cymric	4,080	50,108	59,892	425
*Edison	5,094	50,467	49,533	495
*Elk Hills	6,002	216,114	458,886	†352
*Fruitvale	3,568	58,583	41,417	337
Gosford, East	659	3,282	6,718	24
*Greeley	4,771	60,339	39,661	83
Guijarral Hills	1,892	17,996	27,004	64
Helm	836	10,583	9,417	69
Jacalitos	704	14,887	10,113	105
Kern Bluff	381	3,202	4,798	119
*Kern Front	2,687	81,893	28,107	684
*Kern River	4,450	323,152	46,848	2,556
*Kettleman North Dome	6,657	396,122	83,878	311
*Lost Hills	2,329	73,465	26,535	661
McDonald Anticline	350	1,386	1,614	29
*McKittrick	976	99,490	10,510	232
*Midway-Sunset	12,529	785,565	144,435	3,193
*Mount Poso	2,641	108,454	31,546	389
Mountain View	1,384	56,727	18,273	194
Paloma	3,258	42,756	55,244	73
Pleasant Valley	583	10,937	7,063	20
Premier	1,732	18,126	16,874	245
Race Track Hill	1,518	6,133	13,867	90
Raisin City	1,341	14,240	15,760	97
*Rio Bravo	4,426	68,180	51,820	85
Riverdale	677	11,961	8,039	45
Round Mountain	1,193	42,563	17,437	182
Rosedale	462	727	3,273	21
Russell Ranch	4,623	33,286	46,714	161
Tejon Hills	1,507	5,345	12,655	215
Tejon Grapevine	860	7,146	10,854	108
Ten Section	1,473	53,540	21,460	112
Wheeler Ridge	985	6,794	13,206	82

†Does not include 546 "mothballed" oil wells.

FOR USE ON *ANY SIZE* DRAWWORKS!

American Iron "UNIVERSAL" Makeup and Breakout Catheads

Easily installed on small drawworks but equally desirable for the largest drawworks because there is power enough to break any connection!



With "Universal" Catheads, the line pull is closer to the shaft bearing . . . there is instantaneous engagement and release . . . there are no sensitive toggles to get out of adjustment!

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PRODUCTION AND RESERVES—TRI-STATE AREA

(In thousands of barrels)

ILLINOIS

	1953 production	January 1, 1954 Cumulative	January 1, 1954 Estimated reserves	January 1, 1954 No. of wells
Albion	1,162	12,942	7,058	347
Allendale	453	7,347	2,653	332
Assumption, North	476	4,102	3,898	141
Benton	2,441	28,935	11,065	239
Boyd	539	9,261	3,739	109
*Bridgeport	2,531	251,021	33,979	3,569
Bungay	522	7,261	3,739	172
Centralia	701	37,846	6,154	561
*Clay City	8,065	155,605	44,395	2,699
Cordes	546	6,279	3,721	128
Dale	2,053	47,508	17,492	799
Dix	498	7,709	4,291	121
Ellery	471	1,427	3,573	95
Golden Gate	465	5,831	3,169	177
Herald	639	4,301	3,699	219
Inman, East	539	10,425	2,575	326
Inman, West	367	2,661	2,339	174
Iron	446	4,364	2,636	67
Johnsonville	588	28,029	4,971	358
*Loudon	5,249	173,966	126,034	2,075
Marine	517	8,519	3,481	149
Mattoon	369	10,729	2,271	411
New Harmony	3,491	73,892	21,108	1,632
Parkersburg	451	8,248	2,752	199
Phillipstown	989	13,326	6,674	340
Raccoon Lake	558	1,928	3,072	49
*Robinson	2,045	163,767	26,233	6,690
Roland	489	11,731	3,269	228
St. James	429	12,635	3,365	166
Sailor Springs	1,192	21,481	7,519	621
*Salem	2,541	225,009	119,991	2,202
Woodlawn	422	13,219	2,781	148

INDIANA

Carbon	541	3,540	2,460	101
Griffin	1,251	34,199	8,801	557
Mount Carmel	576	3,938	3,062	161
Mount Vernon	499	6,296	1,704	139
Rochester	988	4,412	3,588	39
Union-Bowman	627	3,214	7,786	375
Welborn	413	1,791	3,209	111

KENTUCKY

Hitesville, South	482	7,336	2,664	171
Morganfield, South	378	3,626	2,374	136
Poole	1,439	11,248	5,752	459
Pratt	471	1,894	2,106	63
Uniontown	778	13,620	4,380	251

PRODUCTION AND RESERVES—KANSAS

(In thousands of barrels)

Augusta	387	46,447	3,553	171
Barry	589	6,650	5,350	70
*Bemis-Shutts	3,526	75,597	34,403	573
Blankenship	632	6,654	5,346	107
Bloomer	2,067	42,949	22,051	296
Boyd	649	5,681	5,319	116
Burnett	2,303	45,215	24,785	298
Burnett, Southwest	521	3,910	4,090	79
Burrton-Haury	781	48,175	8,825	327
Chance	605	2,127	4,873	75
*Chase-Silica	6,007	175,215	74,785	1,377
Chitwood	422	7,369	4,631	69
Cooper	892	3,139	3,861	101
Edwards	1,123	15,801	8,199	153
Elbing	499	23,646	6,354	86
*El Dorado	3,939	215,322	59,678	1,872
Fairport	834	25,060	9,940	200
Fort Zarah	861	2,145	2,855	112
Gates	612	3,532	4,468	89
Geneseo	1,938	34,249	18,751	257
Gorham	1,793	55,804	22,196	444
Graber	721	11,451	6,549	112
*Hall-Gurney	4,640	60,725	39,275	1,173
Huffstutter	415	2,647	5,353	135
Iuka-Carmi	1,314	13,743	11,257	226
Jelinek	531	2,713	4,287	67
*Kraft-Prusa	4,721	65,970	54,030	737
Lindsborg	462	7,262	4,738	104
Madison	412	8,280	3,720	108
Marcotte	1,831	7,776	12,224	227
Max	674	5,679	4,321	90
Morel	1,798	16,686	17,314	214
Novinger	427	630	4,370	28

KANSAS (Continued)

	1953 production	January 1, 1954 Cumulative	January 1, 1954 Estimated reserves	January 1, 1954 No. of wells
Ogallah	635	1,305	5,695	72
Otis-Albert	396	9,495	5,505	138
Ray	1,393	16,027	13,973	154
Rhodes	374	910	4,090	30
Richardson	460	12,263	4,737	71
Ritz-Canton	538	43,179	6,821	179
Russell	616	10,373	4,627	110
Seeley-Wick	1,753	20,567	14,433	329
Semisch	572	1,162	3,838	76
Smolan	919	2,016	2,984	113
Solomon	644	1,607	3,393	88
Stoltenberg	1,270	36,124	13,876	349
Thrall-Agard	1,121	28,099	11,901	278
*Trapp	6,081	143,429	66,571	1,349
Welch-Bornholdt	1,259	23,899	11,101	308
Zenith-Peace Creek	386	38,368	11,632	195
Eastern Kansas Stripper	4,990	190,274	74,726	7,610

PRODUCTION AND RESERVES—LOUISIANA

(In thousands of barrels)

NORTH LOUISIANA

Ada	397	1,161	3,839	46
Benton	1,164	8,048	9,952	13
*Caddo	5,451	205,309	69,691	3,517
Catahoula Lake	462	2,664	5,336	19
Catahoula Lake, West	552	2,694	5,306	40
*Cotton Valley	4,118	74,378	35,622	234
*Delhi-Big Creek	7,152	68,541	156,459	393
DeSoto	543	63,486	11,514	189
Esperance Point	726	1,369	3,631	19
Fairview	466	1,095	2,905	10
*Haynesville†	2,845	121,331	33,669	398
Haynesville, East	1,848	8,370	15,630	118
Holly Ridge	423	9,054	5,946	34
Homer	745	82,231	12,769	301
Knowles	933	6,010	9,990	40
*Lake St. John	4,942	54,922	55,078	138
Libson	1,455	26,897	25,103	286
Nebo	2,140	33,368	26,632	166
Olla	1,691	35,589	19,411	162
*Rodessa‡	1,649	165,897	19,103	495
Ruston	510	1,919	6,081	19
Saline Lake	568	2,787	3,213	21
Sligo	869	9,370	5,630	80
Springhill†	1,166	1,757	6,243	70
Urania	757	35,188	6,812	258
Waskom-Greenwood	478	2,009	3,991	77

†Includes Arkansas portion of field. ‡Includes Arkansas and Texas portions of field.

SOUTH LOUISIANA

Anse la Butte	2,180	31,017	23,983	92
Avery Island	2,886	20,704	29,296	45
Avondale	644	2,434	7,566	16
Bancroft	1,216	9,694	15,306	32
Barataria	1,276	19,123	13,877	28
Barataria, West	1,080	9,066	10,934	21
Bateman Lake	1,049	9,190	10,810	20
Bay de Chene	1,311	5,736	14,264	24
Bay Marchand	1,540	8,365	17,635	23
Bay St. Elaine	3,206	16,941	33,059	56
Bayou Blue	1,158	11,102	8,898	72
Bayou Choctaw	910	7,023	7,977	32
Bayou Couba	858	3,947	6,053	20
Bayou de Fleur	503	3,292	4,708	7
Bayou des Allemands	1,027	6,265	8,735	33
Bayou Mallet	1,740	8,139	16,861	68
Bayou Perot	401	4,093	5,907	11
Bayou Sale	4,727	46,990	48,010	75
Big Island	657	3,819	7,181	31
Black Bayou	835	19,118	10,882	29
Bosco	980	33,429	11,571	47
Bully Camp	1,660	5,666	14,334	31
*Caillou Island	8,585	79,423	70,577	142
Cankton, North	817	6,443	8,557	34
Chacahoula	891	10,430	9,570	41
Charenton	1,271	23,756	12,244	122
Cox Bay	2,602	5,830	22,170	58
Crowley, North	1,265	24,145	13,855	48
David Haas	825	6,017	8,983	20
Delacroix Island	736	5,550	6,450	22
Delta Duck Club	986	6,216	8,784	22
*Delta Farms	5,858	59,022	45,978	109
DeQuincy	686	2,696	7,304	22
Dog Lake	1,533	11,499	13,501	37
Duck Lake	2,967	6,900	23,100	55

Like Dollars in the Bank!

CSCO
PUMPING ENGINES

Because CSCO Pumping Engines are designed specifically for oil well pumping, they are operated more economically. The unique construction of the CSCO embodies four features found in no other engine:

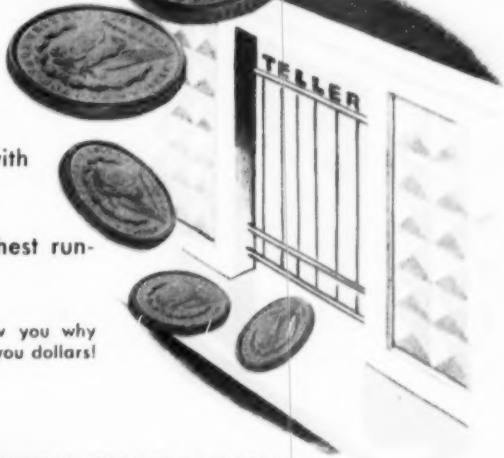
▲ EASY TO START. Safe, too. CSCO Engines now come equipped with starters if desired.

▲ EASY TO SERVICE. No need to stop a CSCO to check oil level, to add oil . . . to check water level or add water.

▲ EASY TO REPAIR. Parts needing repair can be removed with minimum of disturbance to adjacent parts or assemblies.

▲ SMOOTH, STEADY OPERATION. The CSCO is the smoothest running engine for oil well pumping.

Ask a Continental man for full details. He'll show you why CSCO Pumping Engines on your locations will save you dollars!



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THE CONTINENTAL SUPPLY COMPANY
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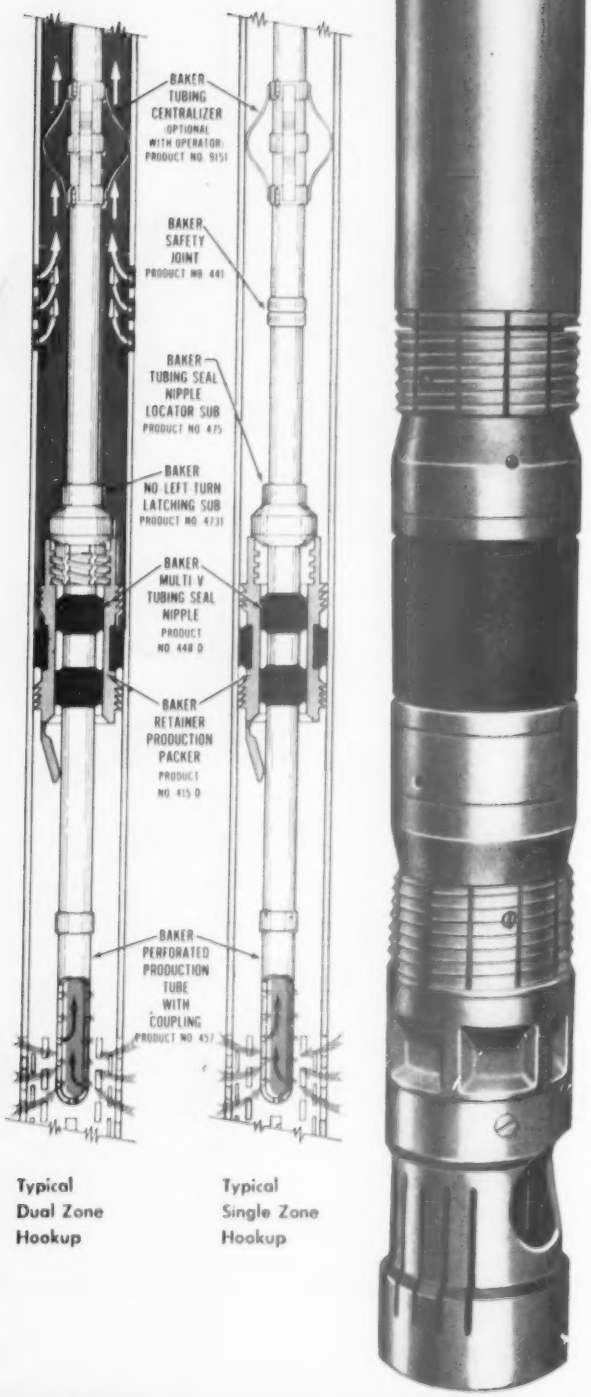
BAKER TUBING CENTRALIZER (OPTIONAL WITH OPERATOR) PRODUCT NO. 915
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BAKER TUBING SEAL NIPPLE LOCATOR SUB PRODUCT NO. 475
BAKER NO LEFT-TURN LATCHING SUB PRODUCT NO. 473
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Typical Dual Zone Hookup

Typical Single Zone Hookup

Do you know that with only ONE Baker Retainer Production Packer you can equip your well for *either* SINGLE ZONE or DUAL ZONE production? And that you can accomplish *any* type of completion for *any* method of production to meet *fixed* or *changing* well conditions?

A single Baker Retainer Production Packer will also outperform many specialized tools when used as a TESTING PACKER – SQUEEZE PACKER – GAS LIFT PACKER – PERMANENT COMPLETION PACKER – WATER FLOOD PACKER – GAS INJECTION PACKER – CORROSION CONTROL PACKER – TUBING ANCHOR – ONE-WAY BRIDGE PLUG – PERMANENT BRIDGE PLUG.

Every production man should be familiar with the many operating advantages of this "Universal Type" Packer, which include . . .

WIRE LINE SETTING—The packer can be set with *wire line speed and accuracy*, using the same set-up just used for perforating. The Baker Packer also can be set on drill pipe or tubing.

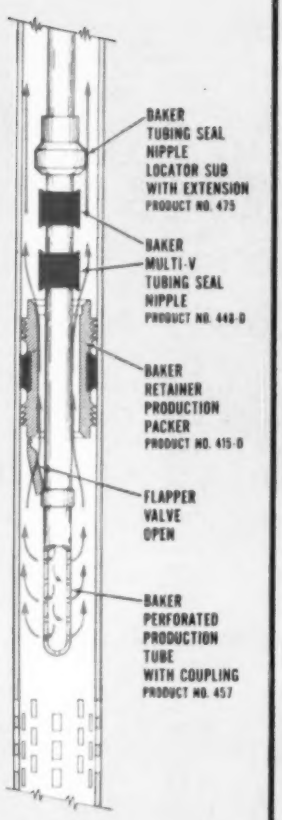
SETTING UNDER HIGH PRESSURE—By using a lubricator, the Baker Retainer Production Packer can be set under high pressure. From the moment it is set, the self-contained, flapper-type, back-pressure valve closes and isolates pressure below the packer.

TUBING STRING IS ALWAYS "FREE"—That valuable string of tubing—whether 1,000 feet or 16,000 feet in length—can be removed by simply picking up the tubing weight.

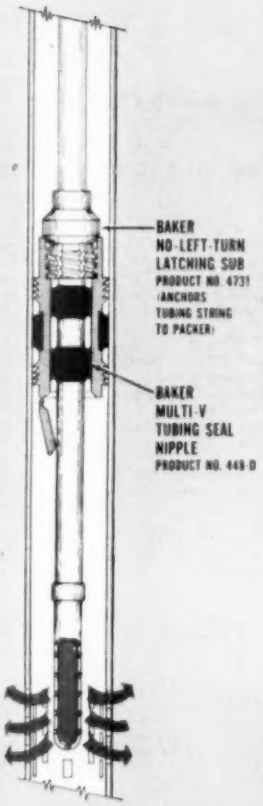
EXCESSIVE "SET-DOWN" WEIGHT OR TENSION NOT REQUIRED—Even when squeezing, formation fracturing, or producing at any depth under pressure, a perfect pack-off is maintained independent of excessive set-down weight, or tension.

HOLDS PRESSURE DIFFERENTIALS FROM ABOVE OR BELOW—Two sets of opposed slips, and a resilient packing confined by lead and metallic sealing rings, effect a permanent pack-off that will hold any pressure differential *either from above or below the packer* that is safe for the well equipment.

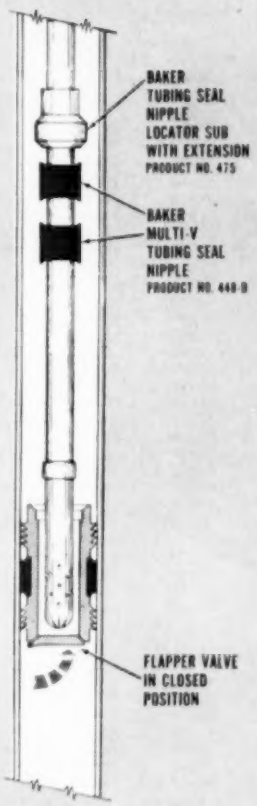
PACKS-OFF AND HOLDS UNDER HIGH BHT—Baker Retainer Production Packers will hold high pressures under conditions of high temperatures. Hundreds of Baker Packers are in successful service in Southwest and Gulf Coast areas where temperatures in excess of 300 degrees are not uncommon.



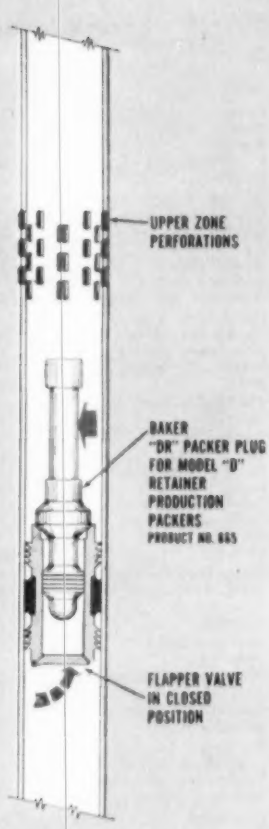
Washing or Circulating Tubing Seal Nipples removed from packer bore. Flapper Valve held open by tubing extending below Tubing Seal Nipples.



Pressuring Below Packer Acid or cement squeeze, formation fracture, gas or water injection. Latch Sub used when squeeze pressures exceed tubing weight.



Isolate Zone Below Packer Tubing String removed, Flapper Valve closed. Isolates pressure differentials (squeeze, productions) from below the packer.



Temporary Bridge Plug For working over zone above packer. DR Plug run in on Baker Retrievable Cementer, and retrieved with overshot. Permanent Bridge Plug can be formed with Trip Bob (not illustrated).

RESISTS CORROSION—The cast-iron used in the construction of Baker Packers is far more resistant to corrosion than the casing in which the packer is set, thus making it ideal for permanent installations, or for use in areas plagued with a severe corrosion problem.

EASILY DRILLABLE—The Baker Packer is constructed of drillable cast-iron, and its design supplements the breaking-up action of the bit. Whether it has been in the well for only a few hours, or for ten years, the Baker Packer can be drilled up in minimum time. Expensive and hazardous "milling-out" operations never are required.

IMPORTANT FACTS

Baker Packers are used in a majority of installations where conditions of extreme pressure, temperature, or depth are present. Baker Packers also dominate Dual Zone installations, particularly those involving two-packer, crossed-flow arrangements.

BUT IT IS ALSO TRUE that *more* Baker Packers are used for *simple single zone* completions than for *any other type of completion*, and that *most* Baker Dual Zone installations employ *only one* packer.

Ask any Baker representative, or office, for complete details, as well as your copy of the recent Baker Equipment News dealing with DUAL ZONE COMPLETION PRACTICES. There is no charge, and no obligation, for specific recommendations and completion planning advice available from Baker Technical Advisers. Why not be prepared for your next completion?

BAKER OIL TOOLS, INC.

HOUSTON • LOS ANGELES • NEW YORK

"IF YOUR WELL IS WORTH COMPLETING,
IT'S WORTH COMPLETING WELL,
with a

BAKER

RETAINER PRODUCTION PACKER

SOUTH LOUISIANA (Continued)

	1953 production	January 1, 1954 Cumulative	January 1, 1954 Estimated reserves	January 1, 1954 No. of wells
Egan	2,013	17,100	18,900	72
Eola	424	27,900	4,100	48
*Erath	4,824	56,638	68,362	70
Eugene Island	1,373	2,907	15,093	11
Fordoche	1,060	3,990	10,010	35
Garden Island Bay	1,571	21,441	13,559	58
Gibson and East	1,391	30,474	11,526	51
Golden Meadow	3,846	53,942	44,058	241
Good Hope	2,063	18,275	19,725	35
Grand Bay	3,791	42,876	37,124	88
Grand Lake	733	11,979	5,021	26
Gueydan and West	1,588	25,373	14,627	47
Hackberry, East	970	46,176	9,824	53
Hackberry, West	3,553	36,342	38,658	96
Horseshoe Bayou	1,405	11,509	13,491	19
Hurricane Creek	522	3,140	5,860	26
*Iowa	2,831	77,062	34,938	117
Jeanerette, South	949	4,479	7,521	[illegible]
*Jennings	1,098	104,839	20,161	116
*Lafitte	4,681	79,147	50,853	89
Lake Chicot	1,069	11,227	10,773	26
Lake Mongoulois	1,094	5,683	9,317	18
Lake Pelto	2,693	19,278	18,722	46
Lake Verret, West	1,745	16,922	18,078	45
Lake Salvador	1,848	20,059	17,941	31
La Pice	1,245	8,872	16,128	28
Leeville	3,266	45,078	24,922	117
Main Pass-Block 35	2,618	3,209	26,791	51
Main Pass-Block 69	1,627	7,211	16,789	17
New Iberia	1,273	45,226	8,774	58
Paradis	3,430	44,712	35,288	82
Phoenix Lake	1,751	4,030	15,970	40
Pine Prairie	953	16,801	9,199	69
Pointe-a-la-Hache	2,697	9,871	24,129	68
Port Barre	1,305	25,399	12,601	74
Quarantine Bay	3,151	43,608	28,392	72
Romere Pass	4,561	11,097	38,903	71
St. Gabriel	1,807	21,620	18,380	51
Section 28 Dome	1,212	7,593	12,407	46
South Pass-Block 24	1,699	3,107	16,893	20
Sulphur Mines	707	24,772	5,228	53
Sunshine	794	3,963	8,037	23
Tepetate	442	18,878	5,122	56
Tepetate, North	750	7,743	8,257	55
Tepetate, West	927	14,875	9,125	34
Timbalier Bay	2,509	5,061	22,939	42
University	1,551	36,443	18,557	54
Valentine	1,217	10,322	13,678	52
*Venice	5,777	51,249	58,751	91
Ville Platte	1,342	52,231	12,769	157
*Vinton	3,649	78,417	36,583	124
Weeks Island	11,304	40,865	109,135	111
West Bay	3,143	23,212	31,788	59
West Cote Blanche Bay	2,896	18,230	26,770	54
White Castle	1,367	21,829	13,171	32
White Lake, East	1,457	14,105	13,895	22

PRODUCTION AND RESERVES—MICHIGAN

(In thousands of barrels)

Beaver Creek	427	3,651	3,349	94
Coldwater	1,249	14,020	9,980	69
Deep River	1,789	20,480	17,520	88
Kawkawlin	481	8,168	4,832	296
Norwich, East	490	3,765	3,235	95
Pentwater	369	4,893	5,107	133
Porter-Yost	326	45,729	4,271	249
Reed City	472	39,344	4,656	163
Rose City	593	1,664	4,336	84
Stony Lake	659	5,404	2,596	76

PRODUCTION AND RESERVES—MISSISSIPPI

(In thousands of barrels)

Baterville	6,035	39,917	55,083	173
Brookhaven	4,439	33,982	41,018	88
*Cranfield	3,254	43,992	56,008	65
Eucutta	1,576	19,003	15,997	124
Gwinville	370	3,104	3,896	78
*Heidelberg	3,381	35,161	74,839	171
Kingston and North	1,083	2,182	7,818	39
La Grange	2,761	22,564	27,436	131
Mallalieu	1,510	23,355	16,645	50
Pickens	665	15,587	9,413	31
*Tinsley	4,519	132,259	42,741	257
Yellow Creek	1,652	8,234	17,766	126

ALABAMA

	1953 production	January 1, 1954 Cumulative	January 1, 1954 Estimated reserves	January 1, 1954 No. of wells
Gilbertown and East	593	4,933	5,067	63
Pollard	955	1,203	4,797	35

PRODUCTION AND RESERVES—NEW MEXICO

(In thousands of barrels)

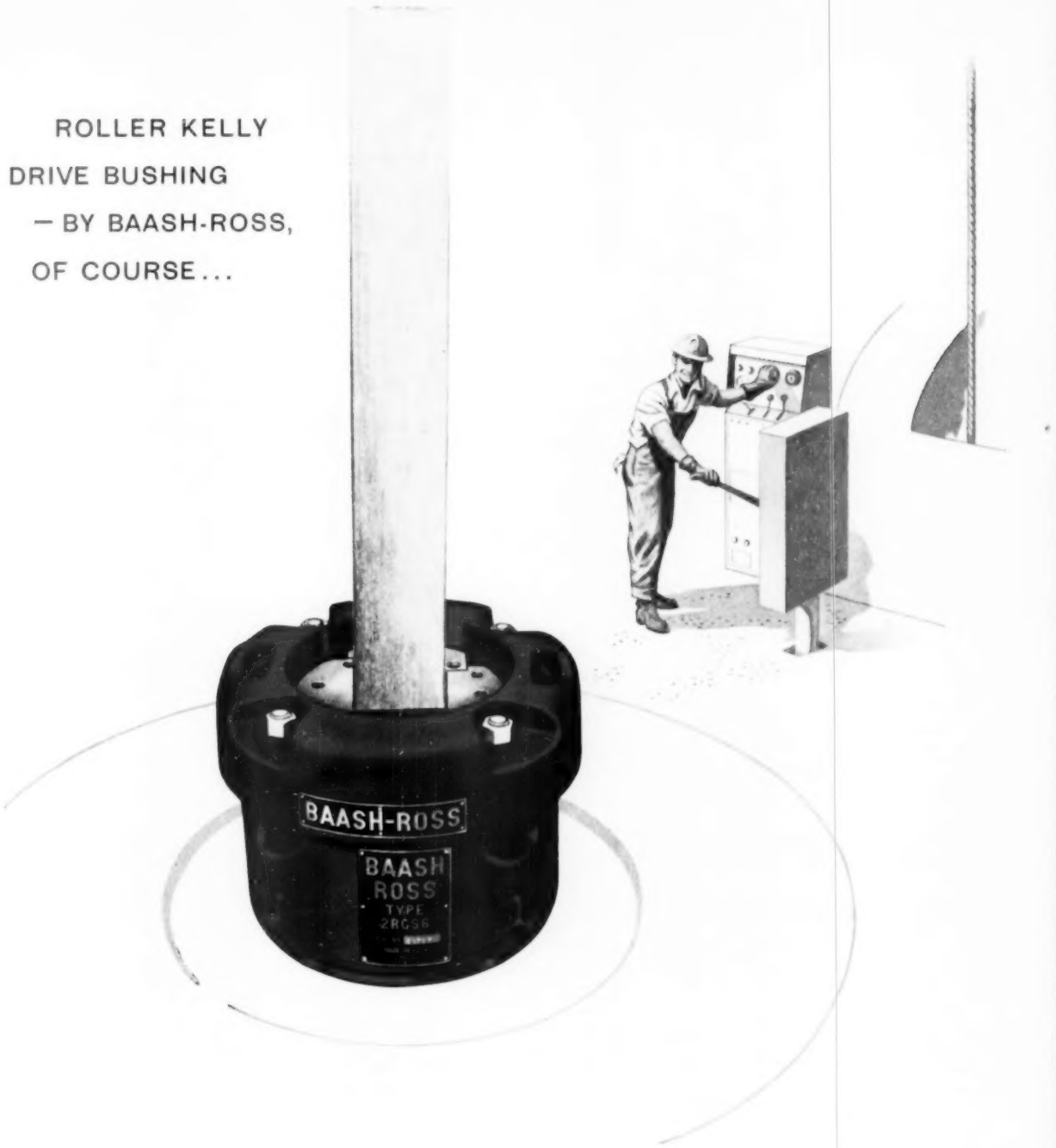
Arrowhead	953	19,652	10,348	119
Bagley	2,033	6,831	23,169	39
Bough	765	2,577	7,423	14
Brunson	3,007	18,932	31,068	138
Caprock and East	1,886	6,276	18,724	143
Cooper-Jal	1,092	30,756	14,244	157
Crossroads	939	3,305	11,695	19
*Denton	8,668	14,548	110,452	143
Dollarhide, West	1,978	2,800	15,200	85
Drinkard	3,454	35,539	39,461	463
*Eunice-Monument	9,321	235,635	124,365	963
Gladiola	1,304	2,400	12,600	21
Grayburg-Jackson	1,162	29,496	15,504	378
Hare	2,047	6,859	19,141	82
*Hobbs	3,663	143,188	46,812	269
Langlie-Mattix	1,669	31,305	18,695	499
Levington and East	2,472	10,108	19,892	124
Maljamar	1,792	27,061	22,939	279
Moore	921	1,063	18,937	17
Paddock	770	9,363	8,637	102
Saunders and South	2,164	4,526	23,474	50
*Vacuum	4,281	66,363	58,637	428
Warren	1,438	2,866	11,134	30

PRODUCTION AND RESERVES—OKLAHOMA

(In thousands of barrels)

Allen (Deep)	1,456	66,594	13,406	386
Apache	1,025	21,352	10,648	42
*Avant	394	101,396	6,604	584
Bebee	1,087	26,714	10,286	482
Blackwell	526	7,625	2,375	94
*Bowlegs	1,121	134,824	15,176	186
Brock, West	640	5,056	2,944	102
*Burbank	3,476	239,443	90,557	1,709
Burbank, South	894	49,477	10,523	249
Cache Creek	956	11,546	6,454	286
Camp	1,606	3,882	6,118	87
*Cement	4,070	72,442	37,558	765
Chitwood	1,050	4,491	3,509	22
Conservation	1,001	2,252	2,748	179
Coon Creek	805	10,260	7,740	40
Coyle, Southeast	579	1,274	4,726	20
Cromwell	517	65,018	6,982	192
Cumberland	2,562	45,894	29,106	143
*Cushing	3,385	394,291	55,709	1,746
Davenport, West	450	2,484	3,516	95
Doyle	3,934	10,712	3,288	177
*Earlsboro	428	133,546	6,454	112
Edmond, East	532	5,040	4,960	121
*Edmond, West	1,887	99,878	25,122	691
*Elk City	6,380	26,902	93,098	302
Empire-Comanche	429	31,850	5,150	393
Eola	1,651	5,105	2,895	27
Fish	369	21,831	3,169	79
*Fitts	842	110,906	14,094	451
*Fox-Graham	5,920	60,848	49,152	735
Garber	393	61,151	3,849	419
*Glennpool	2,145	247,995	42,005	1,694
*Golden Trend	14,271	93,792	106,208	1,419
*Healdton	2,288	220,070	29,930	1,993
*Hewitt	2,703	123,636	36,364	1,148
Hoover, Northwest	601	5,578	4,422	181
Kendrick	1,067	1,147	4,853	112
Keystone	380	4,339	1,661	183
Knox	1,595	28,607	19,393	387
*Little River	826	126,657	8,343	167
Lone Grove, Southwest	694	9,745	5,255	132
Lucien	965	39,832	10,168	160
Mannford	452	8,566	2,434	261
Maud	527	15,087	4,913	93
Milroy	2,325	9,119	15,881	316
Naval Reserve	408	27,820	5,180	243
Naval Reserve, Northwest	1,147	2,134	5,866	105
Oconee, East	509	1,063	3,937	17
*Oklahoma City	5,187	692,270	77,730	571
Olympic	4,064	22,416	12,584	310
Oscar	410	15,201	4,799	270
Pauls Valley	590	20,790	7,210	66
Payson, East	1,725	1,871	8,129	114
Peavine	1,290	3,182	6,818	60
Perry, Northwest	454	2,633	3,367	47
Ramsey	448	16,056	5,944	32
Ringwood	855	6,760	18,240	227

ROLLER KELLY
DRIVE BUSHING
— BY BAASH-ROSS,
OF COURSE...



WORLD STANDARD *of the industry!*

BAASH-ROSS TOOL COMPANY *Los Angeles, Houston, Oklahoma City, Odessa, Casper, Canton, New York*

OKLAHOMA (Continued)

	1953 production	January 1, 1954 Cumulative	January 1, 1954 Estimated reserves	January 1, 1954 No. of wells
Roulette Creek	537	1,507	4,493	15
Sasakwa	529	13,975	5,025	84
*Seminole	1,211	158,468	16,532	320
*Sholem-Alechem	12,736	102,349	107,651	1,448
Soldier Creek	572	7,601	4,399	301
Sparks, East	646	3,127	4,873	112
Stroud	1,259	20,533	9,467	365
*St. Louis	1,507	178,805	21,195	416
*Tatums	3,892	74,391	35,609	1,136
*Tonkawa	217	125,485	4,515	83
*Velma	15,533	100,304	149,696	1,542
Velma, West	531	4,276	2,724	46
Watchorn, East	481	8,006	3,994	34
Wildhorse	419	17,136	4,864	380
Witcher	660	8,936	8,064	159
Woolsey	1,392	8,475	9,525	263
Yale-Quay	2,171	33,745	16,255	286
Northeast Stripper Area	8,763	416,149	98,851	12,701

PRODUCTION AND RESERVES—TEXAS†

(In thousands of barrels)

†Data for 1953 production (November and December estimated) and number of wells furnished by C. D. Lockwood, M & M Building, Houston.

SOUTHWEST TEXAS

	1953 production	January 1, 1954 Cumulative	January 1, 1954 Estimated reserves	January 1, 1954 No. of wells
RAILROAD DIST. 1:				
Big Foot	1,774	3,192	21,808	283
Charlotte	1,526	12,658	19,342	299
*Darst Creek	3,208	85,161	39,839	419
*Luling-Branyon	2,430	101,038	28,962	657
Pearsall	725	7,327	10,673	114
RAILROAD DIST. 4:				
*Agua Dulce and Stratton	7,622	112,999	112,001	467
Borregas	1,922	7,512	22,488	96
Brayton	1,045	7,162	20,838	55
Colorado	856	13,390	11,610	152
Conoco Driscoll	676	15,005	7,995	65
Flour Bluff and East	1,189	21,019	13,981	117
Fulton Beach	2,723	8,283	26,717	228
Garcia	1,245	11,658	14,342	136
Government Wells, North	1,322	60,842	24,158	378
Hoffman	1,757	25,578	19,422	475
Kelsey and South	3,301	24,585	35,415	311
*La Gloria	4,438	51,402	98,598	234
Loma Novia	866	38,014	11,986	360
London Gin	994	4,537	11,463	64
Midway	1,125	17,399	14,601	92
Mustang Island	2,903	6,326	28,674	114
Piedra Lumbre	757	10,251	9,749	92
*Plymouth and East	4,824	68,969	56,031	279
Portilla	5,112	14,121	60,879	123
Red Fish Bay	1,987	3,490	26,510	65
Richard King	627	12,244	7,756	70
Rincon	2,966	31,075	33,925	233
Saxet	979	70,648	19,352	118
*Seeligson	12,666	122,645	377,355	903
Seven Sisters	1,445	39,707	20,293	302
Sinton	1,921	9,034	22,966	150
Sun and North	1,552	17,378	17,622	174
Taft and East and West	1,496	18,036	16,964	136
*Tijerina-Canales	3,011	27,426	92,574	185
White Point, East	3,366	52,410	42,590	297
Willamar and West	2,964	30,710	32,290	237

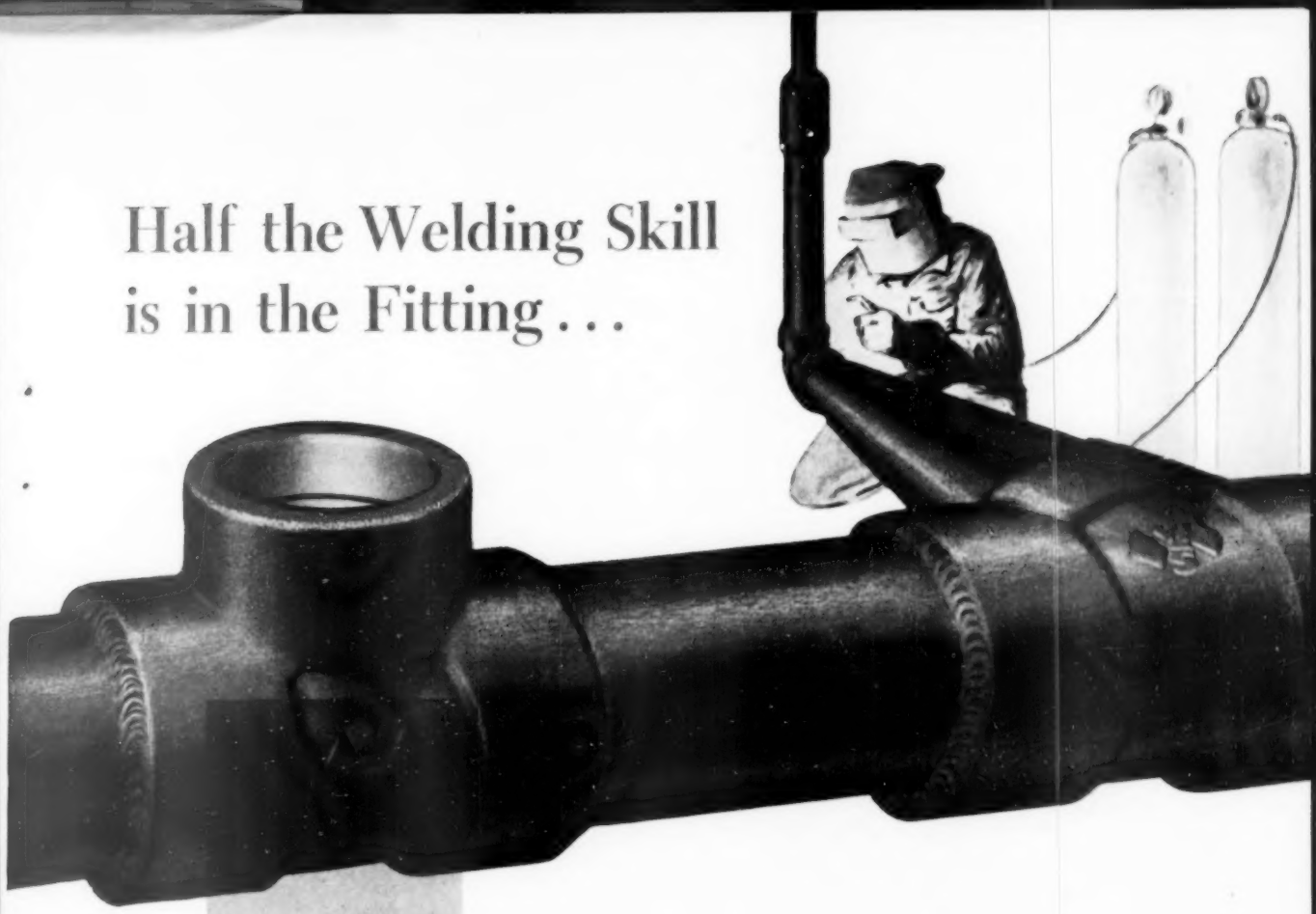
TEXAS GULF COAST

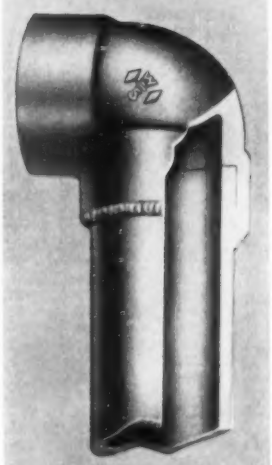
	1953 production	January 1, 1954 Cumulative	January 1, 1954 Estimated reserves	January 1, 1954 No. of wells
RAILROAD DIST. 2:				
Berclair	822	2,513	9,487	88
Bloomington	1,546	11,140	16,860	134
Bonnie View	828	7,969	9,031	76
Burnell-Tulsita	2,986	19,256	35,744	95
Cotton Creek, South	770	1,540	10,460	43
Falls City	1,076	10,196	14,804	72
Francitas and North	1,148	8,271	11,729	51
Ganado and West	1,108	14,142	11,858	125
‡Greta	2,976	65,142	44,858	212
Helen Gohlke	2,568	5,740	32,260	152
Heyser	1,372	39,529	18,471	200
La Rosa	674	14,850	7,150	59
La Ward, North	700	9,593	8,407	106
Lolita	1,503	24,696	18,304	234
McFaddin and East	1,599	21,844	17,156	103
Placedo	2,239	37,129	27,871	270
*Refugio	2,457	69,686	80,314	254
Roche	758	5,305	9,695	48
Slick	766	11,827	10,173	46
Swan Lake	846	3,131	11,869	37
*Tom O'Connor	11,775	196,866	253,134	659
*West Ranch	6,773	85,426	114,574	538
RAILROAD DIST. 3:				
Amelia	1,303	21,762	13,238	144
*Anahuac	6,554	122,292	142,708	325
*Barbers Hill	1,831	99,004	30,996	148
Bay City	1,009	19,382	10,618	53
Beaumont and West	1,142	11,200	12,800	88
Blue Ridge	1,125	15,942	11,058	131
Boling	1,963	17,625	22,375	178
Cedar Point	834	9,316	8,684	36
Chocolate Bayou	3,705	43,492	42,508	108
Clear Lake	724	13,489	8,511	38
*Conroe and West	12,130	332,409	267,591	828
Danbury	840	6,677	9,323	73
Dayton, North and South	1,501	6,464	15,536	88
Durkee	717	1,805	10,195	37
Dyersdale	1,197	11,225	13,775	105
Esperson Dome	1,364	21,397	13,603	109
Fairbanks	1,465	33,427	16,573	256
Fannett	1,791	25,801	19,199	85
Fig Ridge	876	16,222	9,778	76
Gillock-Dickinson	4,267	43,589	46,411	266
*Goose Creek	2,459	89,865	45,135	295
Hankamer	699	11,176	7,824	76
*Hastings	13,865	241,709	258,291	637
High Island	2,600	36,552	29,448	120
Houston, South	1,285	23,788	13,212	73
*Hull-Merchant	4,411	125,561	56,439	315
*Humble	972	135,828	24,172	215
*Katy and North	8,751	62,466	91,534	79
Lake Creek	1,644	25,593	15,407	6
Liberty, South	2,013	25,803	21,197	156
Livingston	1,167	21,700	13,300	135
Lovells Lake	989	19,526	12,474	101
*Magnet-Withers	1,775	57,167	47,833	241
Manvel	2,089	50,740	28,260	152
Markham	436	12,475	3,525	63
Markham, N.-Bay City, N.	1,272	16,755	13,245	79
Midfields	641	4,265	8,735	42
Moore's Orchard	695	6,849	7,151	37
*Old Ocean	6,048	81,683	118,317	154
Orange	1,337	42,384	17,616	151
Oyster Bayou	3,256	30,230	39,770	46
Phoenix Lake	666	1,286	10,714	17
Pickett Ridge	766	10,344	8,656	72
Pierce Junction	1,362	46,600	18,400	104
Port Neches and North	1,859	17,999	19,001	112
Raccoon Bend	2,255	52,975	23,025	182
Red Fish Reef and East	809	10,088	8,912	39
Rose City	754	2,091	9,909	20
Saratoga	655	35,844	7,156	309
Sheridan	1,185	19,541	20,459	7
Silsbee and West	2,658	20,200	29,800	76
*Sour Lake	1,577	93,326	31,674	288
*Spindletop	519	132,919	17,081	154
Stowell	1,634	38,602	26,398	14
Sugarland	1,332	50,131	17,869	42
Sugar Valley	1,252	12,879	16,121	105
*Thompson	10,714	188,145	131,855	344
Tomball	2,128	54,656	27,344	382
Village Mills	3,623	12,571	37,429	158
*Webster	12,585	191,295	258,705	206
*West Columbia	1,911	117,307	27,693	153

EAST TEXAS

	1953 production	January 1, 1954 Cumulative	January 1, 1954 Estimated reserves	January 1, 1954 No. of wells
RAILROAD DIST. 5:				
Corsicana	858	20,137	14,863	872
Ham Gossett	1,196	2,697	12,303	80
*Mexia	285	102,824	4,176	122
Opelika	1,208	28,620	13,380	56
Pickton	1,470	7,331	14,669	118
*Powell	326	120,286	5,714	124
Sulphur Bluff	598	20,372	6,628	63
*Van	10,827	243,122	161,878	596
RAILROAD DIST. 6:				
Carthage	922	20,550	9,450	58
Cayuga	1,435	56,825	15,175	168
Chapel Hill	1,069	15,583	11,417	64
*East Texas	90,627	3,073,779	2,026,221	20,535
*Hawkins	18,754	167,233	332,767	627
Long Lake	1,409	36,619	15,381	162
New Hope	2,197	18,026	23,974	54
Pewitt Ranch	1,462	5,407	17,593	118
Pine Mills	884	3,782	8,218	91
Quitman	2,982	28,462	31,538	167
Rodessa		(See North Louisiana)		
*Talco	5,947	142,075	87,925	700
Waskom	1,437	5,917	14,083	129

Half the Welding Skill is in the Fitting...





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NORTH TEXAS

	1953 production	January 1, 1954 Cumulative	Estimated reserves	No. of wells
RAILROAD DIST. 7-B:				
Hamlin, East	769	2,661	9,339	71
Katz	3,284	5,717	19,283	169
Pardue	1,160	3,961	11,039	75
Round Top	1,883	9,623	20,377	168
Sojourner	1,106	2,268	7,732	70
Wimberly	858	12,169	11,831	130
RAILROAD DIST. 9:				
*Burkburnett	3,714	175,946	74,054	1,651
*Electra	2,362	171,661	38,339	2,737
Hull-Silk-Sikes	1,616	46,172	23,828	421
Joy	884	9,506	11,494	195
*K.M.A.	1,789	105,486	59,514	1,298
Knox City, North	1,013	1,931	10,069	53
Reno	570	3,479	6,521	137
Richardson-Mueller	951	4,269	7,731	69
Rusmag	1,173	3,964	12,036	155
Sandusky	947	2,315	9,685	40
Sherman and East	1,690	7,587	17,413	170
Sivells Bend	902	9,117	10,883	59
Vogtsberger	1,232	7,594	15,406	197
Walnut Bend	4,037	38,646	51,354	343
Worsham Steed	1,082	5,654	10,346	135

WEST TEXAS

RAILROAD DIST. 7-C:				
Benedum	3,444	14,287	35,713	207
*Big Lake	1,018	112,765	19,235	169
Cree-Sykes	2,303	6,097	23,903	207
Elkhorn	1,579	2,484	15,516	35
Fort Chadbourne	5,183	10,390	39,610	318
Hulldale	1,903	3,629	26,371	83
Jameson	4,425	15,316	44,684	269
*McCamey	2,825	89,950	60,050	961
*Pegasus	5,706	14,830	185,170	179
Spraberry Trend area		(See District 8)		
Susan Peak	911	5,600	19,400	80
Todd	2,997	29,660	40,340	101
Vaughn	1,046	5,235	14,765	257
Wilshire	4,620	8,957	51,043	45
World	1,519	19,049	20,951	193
RAILROAD DIST. 8:				
Abell	1,439	14,100	25,900	166
Adair	2,915	10,369	29,631	174
*Andector	6,691	33,662	76,338	131
Anton Irish	2,914	15,512	29,488	175
Block 31	5,204	20,982	54,018	73
Cedar Lake	1,702	12,739	22,261	151
*Cogdell	8,171	26,828	93,172	373
*Cowden, North and South	9,219	139,238	110,762	1,156
*Diamond "M"	10,592	40,424	144,576	457
*Dollarhide	8,259	38,943	101,057	325
Embar	1,080	14,148	15,852	36
Fort Stockton	1,237	4,336	12,664	225
*Foster	4,326	77,898	52,102	640
Fuhrman	1,497	19,827	16,173	301
*Fullerton	7,862	98,690	226,310	730
Garza	3,125	21,421	34,579	469
*Goldsmith	18,663	171,339	228,661	2,067
Good	1,637	7,214	19,786	49
*Hendrick	1,225	218,557	33,443	206
*Howard-Glasscock	6,657	161,882	78,118	1,087
Iatan East Howard and N.	1,108	30,773	14,227	520
Jordan	4,131	37,846	47,154	383
*Kelly-Snyder	25,549	116,160	483,840	1,361
*Keystone	10,990	122,224	227,776	866
*Levelland	11,410	71,860	134,140	1,967
Mabee	824	8,745	16,255	98
Martin	2,643	17,976	32,024	80
*McElroy	7,250	234,326	110,674	929
Means	1,523	22,356	17,644	263
Midlands Farms	6,843	27,920	68,080	300
Penwell	978	33,949	11,051	21
Reinecke	2,748	9,968	27,032	70
Salt Creek	3,309	8,972	41,028	101
Sand Hills	4,065	46,365	48,635	464
*Seminole	6,673	76,730	103,270	419
Shafter Lake	3,044	16,839	36,161	164
Sharon Ridge	1,174	16,529	58,471	874
Slaughter	13,591	198,900	301,100	2,457
Snyder and North	864	7,354	142,646	169
Spraberry Trend area†	17,015	56,383	193,617	1,732
Sweetie Peck	859	3,984	36,016	41
Three Bar	1,577	8,431	17,569	52
Toborg	2,266	23,882	36,118	793
Tunstill	1,211	6,164	16,836	172
*TXL	10,476	114,637	160,363	321
Vealmoor and East	5,008	16,072	58,928	168
Von Roeder	1,357	4,372	13,628	52
Waddell	1,912	22,827	17,173	202
*Ward North Estes	2,791	78,483	51,517	937
*Ward, South	6,130	50,059	69,941	597
*Wasson	19,160	275,358	374,642	1,717

WEST TEXAS (Continued)

	1953 production	January 1, 1954 Cumulative	Estimated reserves	No. of wells
Welch	1,074	20,313	9,687	192
Wellman	2,077	4,912	20,088	29
Wheeler	1,546	20,534	24,466	78
Yarborough and Allen	2,569	10,204	29,796	62
*Yates	12,271	410,737	389,263	628

†Includes all proved Spraberry acreage south of north line of Midland County (except Benedum) in Districts 7-C and 8.

TEXAS PANHANDLE

RAILROAD DIST. 10:				
*Badger	2,227	77,014	37,986	1,079
*Borger-Pantex	2,843	121,635	48,365	607
*Finley	3,402	101,380	58,620	551
Quinduno	600	607	19,393	
*West Pampa	3,172	108,992	51,008	1,082

PRODUCTION AND RESERVES—RKY. MOUNTAINS

(In thousands of barrels)

COLORADO

Badger Creek	441	441	3,559	39
Little Beaver Creek	2,265	2,311	12,689	71
Luft	518	584	2,416	33
Merino	409	1,332	1,668	18
Mount Hope	1,159	1,934	8,066	59
*Rangely	22,954	142,830	207,170	529
Wilson Creek	2,843	26,994	23,006	36
Yenter	1,245	2,476	9,524	65

MONTANA

Bowes Dome	973	2,432	7,568	54
*Cut Bank	2,853	75,482	34,518	1,132
Elk Basin		(See Wyoming)		
Glendive	600	734	49,266	12
Kevin-Sunburst	1,264	59,119	15,881	1,573
Pondera	758	11,187	8,813	317
Poplar, East	1,183	1,552	28,448	29
Sumatra	434	529	4,471	27

UTAH

Ashley Valley	1,009	4,495	8,505	30
Red Wash	418	979	24,021	19

WESTERN NEBRASKA

Cook	395	447	1,553	9
Dorman	391	1,046	1,954	15
Huntsman	529	1,631	3,369	29
Potter, Southwest	595	756	2,244	36

NORTH DAKOTA

*Beaver Lodge	3,010	4,037	135,963	127
Tioga	2,009	2,202	77,798	96

WYOMING

Beaver Creek	600	2,124	37,876	25
Big Muddy	1,386	35,554	9,446	104
Big Sand Draw	2,356	15,996	39,004	16
Bonanza	2,956	5,042	14,958	48
Byron	1,908	30,508	19,492	65
Circle Ridge	791	4,851	7,149	67
Clareton, South	1,076	1,639	5,361	46
Cole Creek and South	2,291	10,912	14,088	89
Crooks Gap	702	5,685	4,315	7
*Elk Basin†	8,907	82,281	217,719	297
Elk Basin, South	826	3,473	8,527	20
Frannie†	3,743	30,393	19,607	122
Garland	3,520	25,499	24,501	103
Gebo	975	4,586	5,414	39
Glenrock	4,310	8,588	31,412	119
Golden Eagle	706	1,615	8,385	6
Grass Creek	3,574	47,301	27,699	287
Hamilton Dome	3,556	30,012	29,988	98
Happy Springs	699	1,008	4,992	19
Hudson	568	4,880	2,120	38
La Barge	383	13,255	2,745	154
*Lance Creek	1,580	92,083	27,917	219
Little Buck Creek	609	4,720	5,280	24
Little Buffalo Basin	1,148	8,153	8,847	26
*Lost Soldier	3,780	54,822	45,178	65
Meadow Creek and North	1,553	6,896	28,104	143
Mush Creek area	2,480	18,143	16,857	407
*Oregon Basin	3,523	60,625	59,375	195
Pilot Butte	496	5,349	4,651	34
Quealy	435	5,358	2,642	22
Rock River	514	29,835	5,165	28
Sage Spring Creek	815	2,605	7,395	22
*Salt Creek	4,176	351,920	58,080	1,159
Steamboat Butte	4,064	23,501	26,499	41
Sussex and West	2,229	5,253	19,747	113
Wertz	2,015	25,519	14,481	27
Winkleman Dome	1,254	6,211	5,789	20
Worland	996	11,250	20,750	20

†Includes Montana portion of field.

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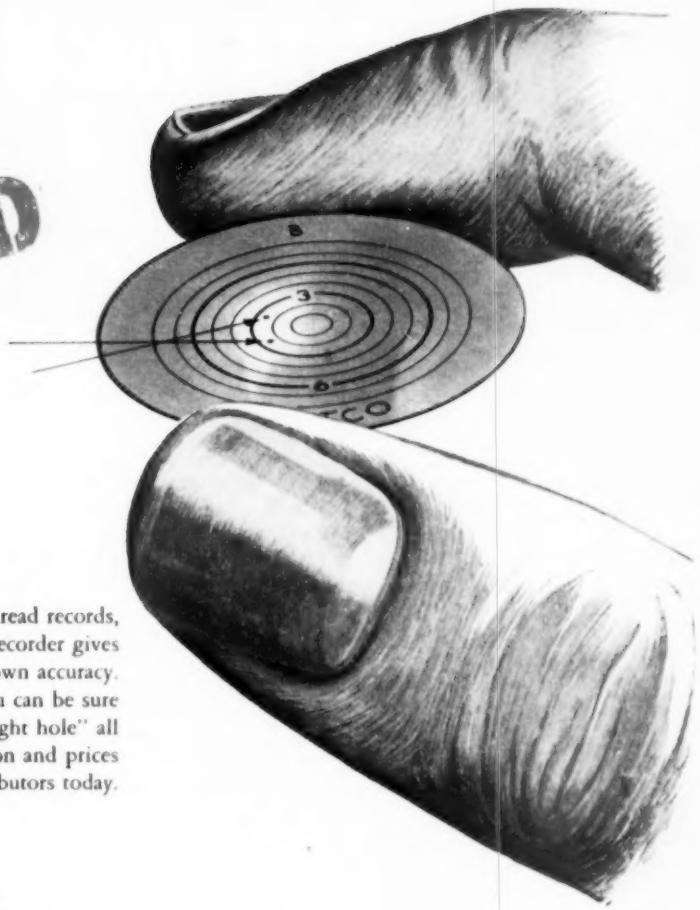

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Highlights on 1953's Oil Discoveries

Here are summaries, area by area, of last year's most important exploratory drilling activities

ROCKY MOUNTAIN

All Areas Share in Biggest Year

Williston Basin

THE year 1953 was one of steady progress for the three-state area of the Williston basin, lacking some of the spectacular influence of the previous 2 years but containing the important phases of both seismic processing and wildcat drilling necessary. There were several discoveries of importance, an indicated first discovery for the South Dakota portion of the basin, and the basin was considered to have moved into position as a definite sizable oil-producing province.

In North Dakota, discovery of oil at Fryburg, the first commercial discovery in that state away from the general Nesson anticline, spurred further drilling on seismic highs through the western portion. This Madison discovery, followed by apparent commercial production in the more shallow new-pay Heath zone, was completed for a flow of 217 bbl. of oil daily through 18/64-in. choke. A confirmation was completed in the field.

Wildcat drilling on the east side of the Williston basin failed to add encouragement during the year, but drilling was continuing in an effort to find more shallow production through this state. Some impetus was given by apparently sizable discoveries just across the line in Manitoba, Canada. A few small producers, apparently all noncommercial, were completed in Bottineau County on the north-central line of the state.

Both development and wildcat drilling continued in the northwestern part of the state, resulting in important new extensions and discoveries in Williams and McKenzie counties, along the Nesson anticline. More important was Stanolind Oil & Gas Co. discovery in Devonian at West Sanish, which well flowed 550 bbl. of oil daily through 12/64-in. choke for completion at the end of the year.

Western and Central Montana, outside the Williston basin, also had an important year for oil exploration. There was sizable geophysics along the mountain front, as a result of discoveries in Canada, and the general eastern Sweetgrass arch area of North Central Montana was also active. However, no unusual discoveries resulted, with the areas still active at year end.

The Williston basin of Montana also enjoyed a year of progress. Sun Oil Co. - Phillips Petroleum Co. had an excellent Ordovician discovery in the Brorson area for the first discovery in Richland County, in the northeastern part of the state. This well flowed 745 bbl. of oil daily through 20/64-in. choke following acid treatment. Important drilling at East Poplar, Roosevelt County, considerably extended production in this field, and established apparent new pools. Shell Oil Co.'s Cabin Creek discovery, Fallon County, along the general Cedar Creek anticline, attracted attention due to the large probable pay section drilled, and estimates of high potentials.

Powder River Basin

The east side of the Powder River basin, center of periodic interest for years, again dominated the scene in Wyoming during 1953. Production was established at Clareton southwest of Mush Creek in 1952, but there was little drilling for several months. During 1953 production was extended over a 16-mile area through Clareton south nearly to the county line. More than 50 rigs were moved into the area in drilling the Newcastle (Dakota) zone, with some wells completed as sizable producers. Area proven at the end of the year indicated a more active drilling program will be continued through 1954.

Of the 32 discoveries in Wyoming during the year a large part were in the Powder River basin. Wildcat drilling, and discoveries, continued on the west flank in the general Sussex area,

Fig. 1—Letters on map denote areas of most significant wildcat development in the Williston basin in 1953.

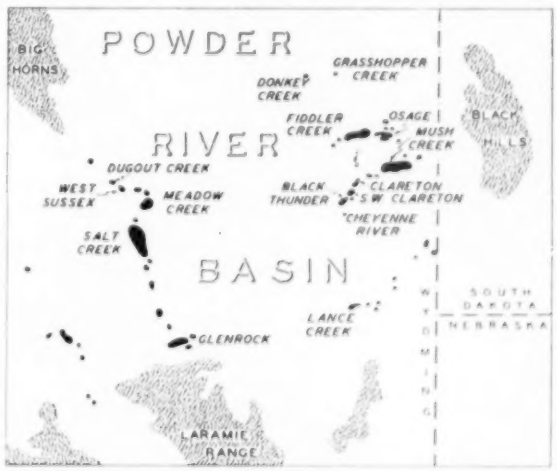

Fig. 2—This basin is Wyoming's most active oil-producing area. Weston County on the eastern flank of the basin was the most active area in the entire Rocky Mountain region in 1953.

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Review—Forecast Oil Discoveries

scene of most Wyoming drilling for several years. New discoveries were made at Dugout Creek, Johnson County, northwest of Sussex fields. Development drilling continued in the fields south of Salt Creek and in the general Glenrock area, Natrona and Converse counties. At the year end an apparent discovery in the deep basin area of Converse County appeared probable.

Big Horn Basin

Deeper production in the Big Horn basin, where early field drilling around the perimeters has been under way for many years, was primary in the basin this year. Heretofore the east flank has been of less importance than that of the southern and western areas. This year the general Manderson area, with discoveries to the south, was of princi-

Fig. 3—First oil production from the Ordovician was opened in 1953 at Argo Oil Corp. 51 Government in Hamilton Dome field, Hot Springs County (B on map). Devonian oil production was indicated on tests at a deep Garland field well in Big Horn County. (A on map.)

pal interest. With these discoveries a considerable reserve has been developed, extending along the east flank for a number of miles north and east of Worland. In general, smaller discoveries were made on the west side, although Sun Oil's Ralston area, Park County, discovery flowed 200 bbl. of oil daily through choke from Frontier sands at 11,000 ft.

In Hot Springs County, on the south side of the basin, Argo Oil Corp. made a new pay in the old Hamilton Dome field with production now from the Big Horn zone, a new producing formation for the basin. Forest Oil Co. made its first Wyoming discovery in 1953 with production at Walker Dome. Stanolind, large producer in the basin, found Phosphoria production at the rate of 290 bbl. of oil daily in the Dickie Unit.

Wind River Basin

The large Wind River basin in the central portion of Wyoming was also active during 1953. Several discoveries were made in the general Sand Draw field area. Sinclair Oil & Gas Co. made a small Tensleep producer at North Sand Draw. Sohio Oil Co. made two new-pay discoveries, both Tensleep and Phosphoria, at South Sand Draw, Fremont County. West of Casper near Notches Dome, Superior Oil Corp. made a Phosphoria zone discovery at Okie Draw, with additional wildcat plans under way for the new year on the north flank of this basin.

Green River Basin

One of the most interesting plays to develop during 1953 was the widespread exploratory program for the southwestern part of the state, the Green River basin. Here the only Tertiary production in the Rockies for many years was established as early as 1926. The area has been semidormant with chief interest in other areas of the region. During 1953 an extensive lease play was made through the basin, a number of wildcats drilled, and discoveries resulted in minor proportion. Important gas reserves in Tertiary were found in the general Big Piney area. Approval of a proposed

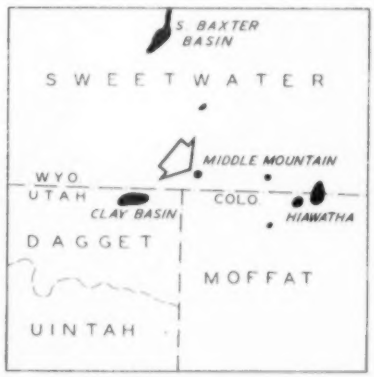

Fig. 4—Arrow points to Sweetwater County, Wyoming's Middle Mountain area where Stanolind Oil & Gas Co. confirmed Mesaverde production at 2 Unit.

gas line through the area to the Pacific Northwest is expected to further extend this activity.

Denver-Julesburg Basin

Denver-Julesburg was again leader in all drilling during the year. This was due to the continued wildcat and development drilling for the Dakota sand series, where more than 175 fields have been established in the past 4 years. This year 36 fields and new pays were discovered in the Colorado portion of the basin, 26 in western Nebraska. Sev-

Fig. 5—The California Co. opened Permian production in the Black Hollow area of Weld County in the western part of the Denver-Julesburg basin.

eral of the fields were of minor consequence, others of increased importance.

In Colorado the most active area of the state during the year was the general Little Beaver-Badger Creek area where development drilling proved a field currently second in importance to Rangely in the state. By far the majority of the fields in both states were drilled by independent operators. Both exploratory and development drilling in this basin moved further south during the year, indicating the trend probably to be followed during the coming year.

Western Colorado

A new spirit, new geologic thinking, and new interest were evidenced in most of the western portion of Colorado during the year. Activity moved eastward in the Uinta basin from Utah, and southward in the Green River basin from Wyoming. More wildcats were drilled, more discoveries made. Mountain Fuel Supply Co. made a Mesaverde discovery at Sugar Loaf, Moffat County, and a new-pay discovery in Lance at Powder Wash field. Anderson-Prichard Oil Corp. had a Morrison discovery at Temple Canyon. In Mesa County, Frontier Refining Co., of Denver, had a new-pay discovery in Dakota at Bar-X, near the Utah line.

The southwestern part of the state also had additional attention as activity moved northward in the San Juan basin from the rapid-drilling New Mexico area. Undoubtedly both the San Juan and Paradox basins of western Colorado will have added drilling during 1954.

Utah

Although the Uinta basin of Utah had less interest in 1953 than in the prior 2 years, due to cost of drilling, production difficulties, etc., there were still several wildcats drilled and discoveries made. Carter Oil Co. found production at Walker Hollow, near Red Wash, and did additional development

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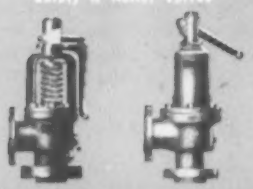

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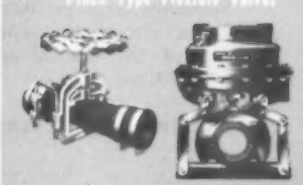

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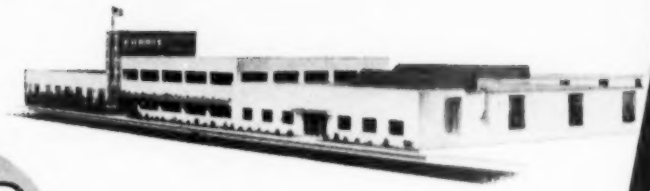

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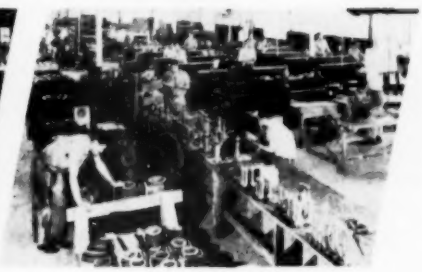

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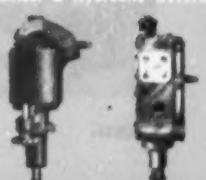

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Review—Forecast
Oil Discoveries

drilling. Continental Oil Co.'s Chapita Wells discovery early in the year proved to have some disappointments.

Of much more concern was the Wasatch Plateau area in the central part of the state where development drilling at Clear Creek proved a substantial reserve and indicated a major gas field for the nation. Both El Paso Gas Co. and Three States Natural Gas Co. competed for leases and in wildcat drilling through the area.

CALIFORNIA

California Wildcats at Peak, But No Major Pool Found

by D. H. Stormont

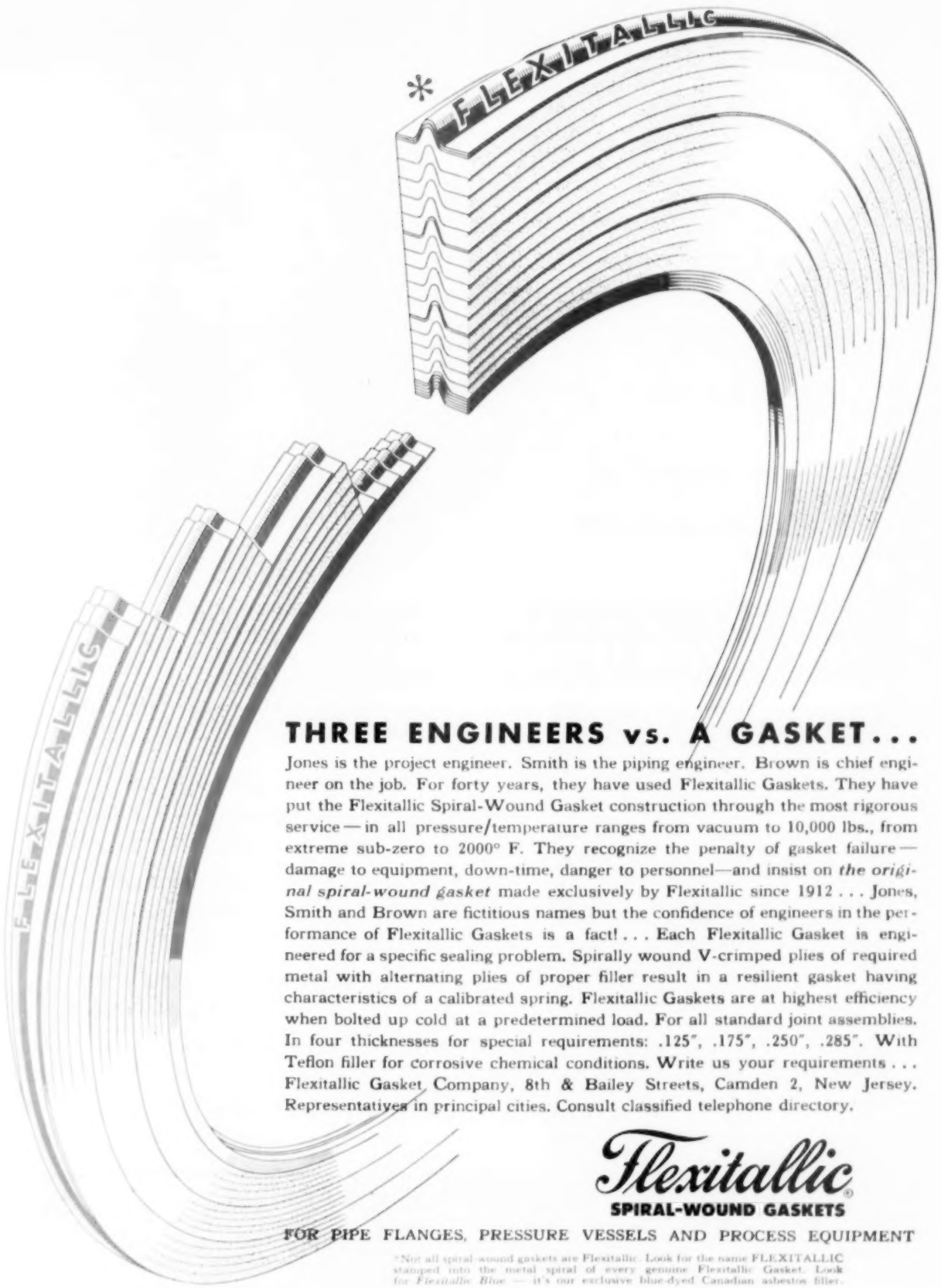
CALIFORNIA operators completed a record number of exploratory wells but apparently failed to find a new oil field or pool of major importance. At the first of the year it appeared the new oil reserves uncovered by drilling would be insufficient to offset normal decline in the older fields.

In drilling 666 exploratory tests, 69 more than in the previous record year of 1952, 9 new oil fields and 48 new oil pools were discovered. An additional 29 wildcats were successful extension tests. The remainder of the 102 successful wildcats were gas wells. They consisted of six new field discoveries, five new pool openers, and five extensioners.

As of December 31 the new oil field discoveries were producing about 2,000 bbl. daily and the new pool discoveries, 12,000 bbl. Most of the new fields were still in the one-well classification so their importance will be determined only through future drilling. About 110 wells had been completed in the 48 new oil pools, most of which likewise contained only one well at the year's end.

Of the state's three oil regions, San Joaquin Valley, Los Angeles basin, and Coastal California, the last contributed the most important developments. These consisted of extending Ventura Avenue's D-5, D-6, and D-7 zones into neighboring San Miguelito, and the initiation of full-scale development of the D-8 zone in Ventura Avenue. Also for the first time at Ventura Avenue a well drilled into Miocene rocks. Though plugged back because of mechanical conditions, the test drilled through about 1,200 ft. of Miocene oil sands.

New footage record . . . New records



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also were established in the amount of footage drilled. Development drilling accounted for 8,239,600 ft. of hole, 700,000 ft. more than in 1952. A total of 3,115,100 ft. of hole was drilled in wildcatting, almost 350,000 more than in 1952.

Average well depths continued to increase. That of development wells was 4,310 ft., 200 ft. more than in 1952. The average depth for wildcats was 4,680 ft., 40 ft. deeper than that of the previous year.

While the average depth of exploratory tests increased only slightly, an exceptional number of deep tests were drilled. Five wells were drilled below the 15,000-ft. mark, two of which respectively set new world drilling and producing depth records.

At Paloma field near Bakersfield, Ohio Oil Co. 72-4 K.C.L.-A established a new world's depth record in drilling to 21,482 ft. In nearby North Coles Levee, Richfield Oil Corp. 67-29 C.L.A. set a new producing depth record in being completed as a condensate well in Eocene sands at 17,497-17,892 ft. Of the three other wells, two were in Ventura Avenue.

Ventura Avenue activity . . . Although discovered earlier, last year witnessed the beginning of widespread development of the D-8 zone. The new deeper pay is separated from the D-7 zone by a shale section which is less than 20 ft. thick in some wells. Thus while the new pay unknowingly may have been penetrated in earlier D-7 producers, General Petroleum Corp. 30 Barnard tentatively is being credited as the discovery.

By the first of 1954 about 25 producers had been completed in the deeper pay, which averages about 1,000 ft. thick and is topped at depths between 10,000 and 13,000 ft. The development took place over an area about 2½ miles long and ½ mile wide, principally in the northern half of the east-west trending field. As some of the wells were completed in both zones, production of the D-8 wells so far has been combined with that of the D-7 zone.

Another development at Ventura Avenue, which throughout the year was the state's most active field, was the extension of D-5, D-6, and D-7 zones into the eastern portion of San Miguelito. Development so far has been confined to the discovery area but it is expected the new pays will materially add to San Miguelito's reserves. Output of the five producers completed to date has been included with that of Ventura Avenue.

Third development was that for the first time at Ventura Avenue the thick Pliocene section was penentrated. The well was bottomed at 15,436 ft. in an upper Miocene formation, after drilling through two oil sections below the D-8 zone which were respectively about 550 and 630 ft. thick. Collapse of the 5-in. liner at 13,600 ft. prevented an adequate test of their productive possibilities. The well, drilled by Shell Oil Co., thus was plugged back to 13,322 and completed in the D-8 zone.

Coastal California . . . Other Coastal region developments included new pool discoveries at West Cat Canyon, Guadalupe, and South Tapo Canyon. These finds, coupled with continued development of the more important discoveries recorded in 1952, resulted in the region accounting for a greater percentage of California's drilling and production.

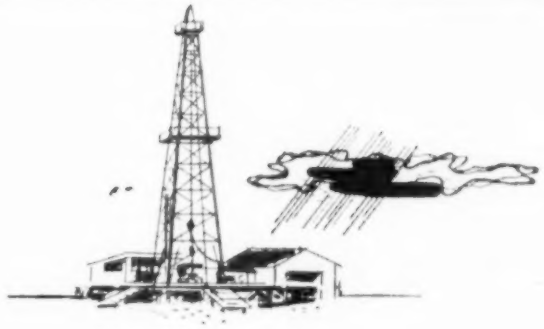
Discovered in February, South Tapo Canyon contained 17 oil producers at the end of the year. The new pool, a Miocene sand found at depths of 2,000 to 2,500 ft., was thought to be almost completely developed. After reaching a peak of about 4,300 bbl. daily, its output had declined to less than 3,000 bbl. in December.

A new discovery at West Cat Canyon by Standard Oil Co. of California 164 Alexander led to the drilling of 30 new producers in that field. The new pool opener was completed in March, producing 23°-gravity crude from the Sisquoc sand, Pliocene age, at a depth of 3,500 ft.

The deeper pay discovered by Thornbury Drilling Co. G-4 LeRoy in Guadalupe field had received little development but it is believed to constitute a large heavy-oil reserve. The new pool, in the Knoxville sand of Jurassic-Cretaceous age, was found at 2,761-3,287 ft., immediately below the regular Sisquoc pay. Union Oil Co. at midyear assumed control of the field, which will require some 200 more wells to develop to a 10-acre well pattern.

San Joaquin Valley . . . Exploration in the San Joaquin Valley area was highlighted by the search for new Eocene production in the central and southern portions of the valley. The search, touched off by the 1952 discovery at Wheeler Ridge, was not too successful.

In late August a new Point of Rocks pool was found by Superior Oil Co. in Cymric field. No further drilling was done so its importance is yet to be determined. The other southern valley Eocene find was the record-setting producer of Richfield at North Coles Levee. While the well is of significance in that it establishes production from these formations in the central valley



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area, it is regarded as being commercially uneconomical.

Of the numerous other discoveries, the more important appeared to be those at Wheeler Ridge, Rosedale Ranch, and Belgian Anticline. Several others could prove of substantial value but because of lack of development can not now be fully evaluated. These included Richfield's deeper discovery at Los Lobos, Union Oil Co.'s. Hebling sand (Miocene) pool at Rio Bravo, and possibly Superior Oil Co.'s Stevens sand find in the Old River area.

Wheeler Ridge pools added were in Miocene sands. At the year's end, the 3 new pools contained 12 producers, with a combined daily output of approximately 1,000 bbl. At Rosedale Ranch, where Standard of California in January opened a new Pliocene pool, 12 producers also were added.

While development drilling was at a slightly faster pace than in 1952, San Joaquin Valley fields showed a minor drop in production. Despite output of the Elk Hills Naval Petroleum Reserve being increased 15,000 bbl. daily, the regional total averaged about 3,000 bbl. daily less than in 1952.

Los Angeles basin . . . The caliber of oil discoveries in the Los Angeles basin likewise was such that new production developed was insufficient to offset decline. Due to a drop of about 10,000 bbl. daily in Wilmington's output, the regional total declined almost that much.

Bandini field, discovered in September by General Exploration Co. 1 C.C.M.O. about 1 mile west of the East Los Angeles field, could prove to be an important find. The well flowed light-gravity crude at an initial rate of 500 bbl. daily through a ¼-in. choke, with production coming from a Miocene sand at 6,278-6,318 ft. The company's second well, a ⅓-mile stepout, reportedly topped the sand about 150 ft. higher than the discovery but was still drilling in early January.

Minor extensions and new fault-block pools were recorded at the old Dominguez, Richfield, and Santa Fe Springs fields. Exploration along the Whittier fault-line trend of fields also resulted in oil finds being made at Whittier, East Sansinena, and East Olinda. As a result of this activity it appeared Brea Canyon production would be linked with that of the Sansinena field. New finds also were registered at West Newport and Huntington Beach but the developments offshore from these fields were more important.

Offshore activity . . . A significant development was the resumption of offshore exploratory drilling. From an upland site near the shore at Newport Beach, Monterey Oil Co. slanted a test under the Pacific Ocean to open a new offshore pool. Completed in December as a 100-bbl. pumper at a drilled depth of 4,518 ft., the discovery is believed to be a new-field discovery rather than an extension of West Newport field.

About 1½ miles offshore from Seal Beach, Monterey again was at work constructing a drilling island after a court battle halted activity for almost 1 year. First test from the 75-ft.-diameter structure is expected to start in April.

Ground work for letting of development contracts on city of Long Beach submerged lands also progressed. Development of parcels bordering proved areas in the Long Beach Harbor area is expected to start in the next few months. Likewise development of some 600 semiproved acres under the city may be initiated during the year. It is believed unlikely, however, that any development from offshore drilling islands will start during the coming year.

This offshore activity, plus that at Huntington Beach and West Montalvo, is expected to account for nearly all offshore drilling in 1954. The California Lands Commission is not expected to grant any new tidelands leases before 1955, unless drainage of state lands is occurring.

TEXAS GULF COAST

Good Hunting Grounds Still Abound

by Neil Williams

THE Texas Gulf Coast continued a good hunting ground for new oil and gas reserves during the past year. Despite the extensive exploration and development which have been carried on in previous years, there was no letup in discoveries.

Discoveries included not only a long list of entirely new fields, scattered through the whole area, but also new productive zones and extensions for most of the existing fields. Few counties failed to add new production of some kind. Although many of the discoveries may not prove particularly important in themselves, in the aggregate they add up to a highly successful exploratory year.

New gas-distillate-producing discoveries in Brazoria, Galveston, Matagorda, and Calhoun counties stood out prominently among the year's developments. Among these were major extensions and prolific new and deeper horizons in the Chocolate Bayou area of eastern Brazoria County, and the discovery late in the year of sizable gas-distillate production in the previously unproductive Alligator Point area, same county.

A few miles east of the Chocolate Bayou area, in the Alta Loma and Southeast Alta Loma areas, of Galveston County, additional substantial new gas-distillate reserves were established.

Exploration in the Lavaca Bay and Matagorda Bay areas of Calhoun and Matagorda counties resulted in additional gas-distillate discoveries. In Matagorda County, Skelly Oil Co. opened what appeared to be an important new oil field in the Cummins area. A townsite oil discovery at Midfield, in Matagorda County, also looked good. The discovery has just been confirmed with another producer, but several dry holes have been drilled in the general area in the meantime.

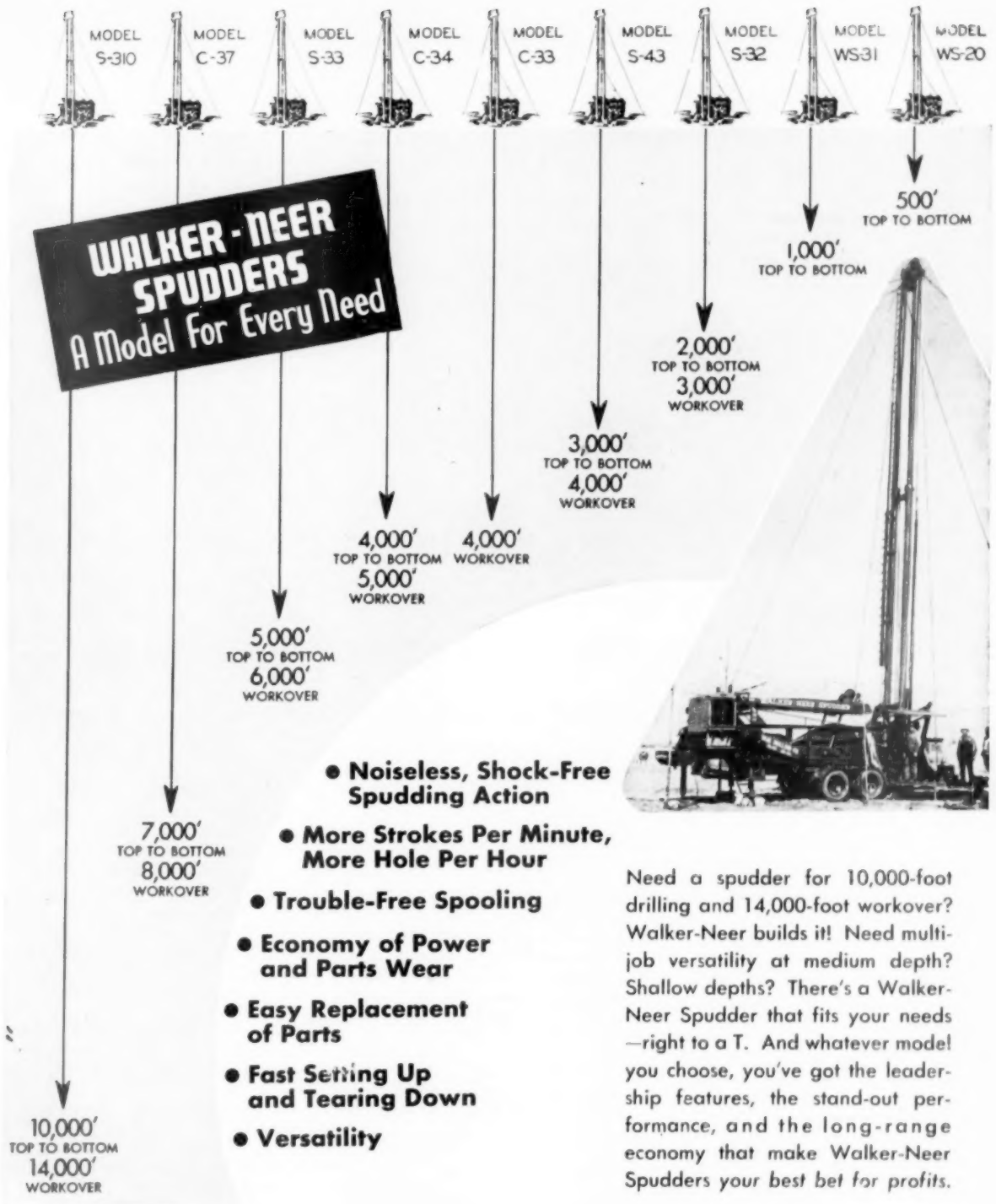
Salt Domes Yield Discoveries

Exploration and development in these areas have been directed primarily to lower Frio sands, which have proved unusually prolific throughout the general coastal region.

Northern Harris County and southern Montgomery County experienced an active drilling play in exploration and development of new Yegua production. Various new fields along the county line, including Bender, in southern Montgomery County, and Kuhlman and East Kuhlman, Indian Hills, Huffsmith and East Huffsmith, on the Harris County side, figured conspicuously in the play. Spreading productive areas of these respective fields appeared to joining several of them.

Farther east and more inland, in Jasper County, the new Buna and North Buna, and adjacent Castillo and West Castillo fields appear to be developing into a major gas-distillate-producing area from Yegua sands.

Exploration around many of the Gulf Coast's long-exploited old shallow salt domes, around which potentialities for new production never seem to be exhausted, continued to prove attractive and yielded a number of important discoveries. Even at Spindletop, the



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Review—Forecast Oil Discoveries

Gulf Coast's first field, which has been actively explored since the beginning, produced several new-pay sand discoveries and extensions.

The old Big Hill dome, in Jefferson County, was the scene of a particularly active development play in proving up new flank sectors, and new and deeper horizons. More than a half dozen rigs were operated almost continuously throughout the year close around this dome.

An active development play got under way on the west flank of the old Saratoga dome, in Hardin County, following discovery late in the summer of prolific production in Yequa sand. North Dayton, and South Liberty, in Liberty County; Sour Lake and Batson, in Hardin County; Humble, in Harris County; Stratton Ridge and Allen, in Brazoria County, were among the many other old domes, around which important new exploration was undertaken, and new pay or sector discoveries made.

Farther down the coast in the Corpus Christi area, Nueces, Aransas, San Patricio, and Refugio counties contributed a series of discoveries, both gas-distillate and oil, in new fields and additional productive horizons in older fields. Exploration and development in and immediately around Corpus Christi Bay was particularly active and successful. Among the newer fields receiving active attention were West Fulton Beach, in Aransas County; East Corpus Christi Bay, Corpus Channel, Caso del Oso, in Nueces County; Puerto Bay, on the Aransas-San Patricio county line; and Mustang Island, in Aransas County.

In Cameron County, southernmost of the coastal counties, a Miocene sand oil discovery by Texas Gulf Producing Co. created considerable interest.

In the more inland counties of South Texas, exploration continued to uncover numerous small producing areas and additional reservoirs in Jackson, Pettus, Vicksburg, and Frio sands. One of the most promising discoveries was in the Monte Christi area, Hidalgo County, where Superior Oil Co. proved prolific gas-distillate production in multiple sands.

EAST TEXAS

Interest Revived in Gas-Distillate Discovery

By Carl Hoot

DEVELOPMENTS in East Texas during the year 1953 included the revival of interest in the 2-year-old Rains County gas-distillate discovery southeast of Emory. This was R. J. Carraway 1 Puckett, which was gaged at 45,000,000 cu. ft. of gas a day from the Smackover. The amount of gas was not unusual but its high hydrogen sulfide content was, being in the neighborhood of 40 per cent.

Plans for a sulfur industry, new to East Texas, were canceled when Shell Oil Co. drilled two unsuccessful confirmation wells. Production was deep, at 11,958 ft., and surveys for an extraction plant indicated at least six wells would be required to make it feasible.

The renewed interest in the area is occasioned by Shell 1 Homer Bishop, located approximately ½ mile north of Puckett's discovery, which was drilling below 10,701 ft. at year's end.

East Texas field area . . . Possibility of a deep drilling play along the western side of the big East Texas field was seen following discovery of Pettit limestone oil at Humble Oil & Refining Co. 1 Timms, 4 miles west of shallow Woodbine sand production.

No. 1 Timms completed in September, flowed 197 bbl. of oil a day from pay starting at 8,021 ft. Since then, Humble completed a northeast confirmation well from the same pay, flowing 247 bbl. daily, and is drilling a third test. The new field is called Wright Mountain.

Hitts Lake field . . . Early in the year Sun Oil Co. brought in 1 Hitts Lake as a Paluxy discovery, 5 miles north of Tyler in Smith County. Completion gage was 230 bbl. of 27° oil a day from pay at 7,174-7,242 ft.

At year's end, seven wells had proved 280 acres, and two wells were drilling. Top of pay in the field is found at an average depth of 7,150 ft. and reservoir thickness varies from 14 to 18 ft., with an average porosity of 19.7 per cent. Average permeability is 268 md.

Neches-Woodbine pool . . . Status of this discovery, Humble 1 Northeast Neches Oil Unit, southeast of Boggy Creek field in Anderson County, was one long southeast extension into Cherokee County, and five new operations planned for the Anderson County side.

Humble's discovery was brought in flowing 139.8 bbl. of oil a day through ⅝-in. choke from Woodbine perforations at 4,704-10 ft. The outpost well, Humble 1 Harry Carter, was not completed at the year end, but had flowed 104 bbl. of oil in 12 hours through ¼-in. choke. Pay was perforated at 4,671-79 ft.

The five development wells were scheduled by Byrd Oil Corp., and all were located on the R. L. Springer tract in the G. W. Tuggle and William Wright surveys.

NORTH TEXAS

Drilling on Increase in Most Parts of Area

By Carl Hoot

DISCOVERY of a highly permeable oil-bearing section in lower Cambrian dolomites in White Flat field of northeast Nolan County, and subsequent development work in the same pay section, was one of the highlights of the year for North Central Texas.

In North Texas fields, the Caddo conglomerate objective accounted for a large share of wells drilled throughout Jack and Montague counties, and in Grayson County a number of small Strawn areas were opened. Oil Creek sand fields were extended and Big Mineral Creek field received a long southwest extension which produced over 34,000,000 cu. ft. of gas daily plus a heavy distillate yield.

Early in the year, American Trading & Production Corp. 1 Little, in White Flat field, found a continuous 198-ft. Hickory sand pay section. The thick section and its permeability were unusual for that formation. Its completion potential was also high at 857 bbl. daily through ½-in. choke. This well was the first in Nolan County, and brought in the second successful Cambrian producing area in recent years. Previous drilling in Bronte pool, to the south in Coke County, found Cambrian production in the Wilberns formation.

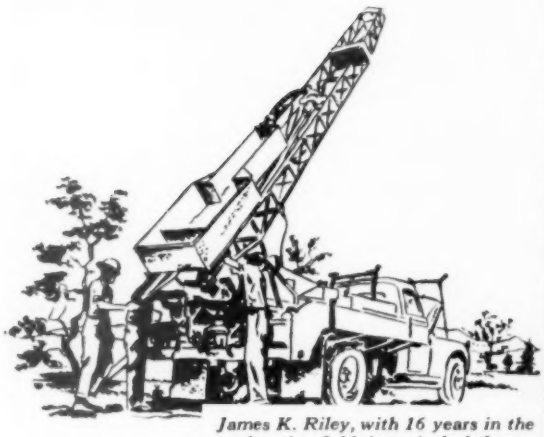
Rocks of Upper Cambrian age are exposed in the Llano uplift of Texas, in the Arbuckle and Wichita mountains of Oklahoma, and in the Ouachita Mountains of southern Oklahoma. In Texas and southern Oklahoma, the Cambro-Ordovician boundary falls within thick limestone units (Ellenburger and Arbuckle), and the division has been based largely on paleontologic evidence.

The Cambrian of the Llano uplift is divided into the following units, listed in ascending order: and the accompanying chart shows the division as made in southern Oklahoma:

. . . Hickory formation. Mostly conglomerate or sandstone, resting on the eroded surface of pre-Cambrian schists, gneiss, and granites, and grading upward into glauconitic sands and limestones of the Cap Mountain.

. . . Cap Mountain formation. Mainly glauconitic limestone, containing the Lion Mountain sandstone member at its top.

. . . Wilberns formation. Consists of



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limestone with some shale, and locally limestone conglomerates. It contains beds at the top that were formerly classed as Ellenburger.

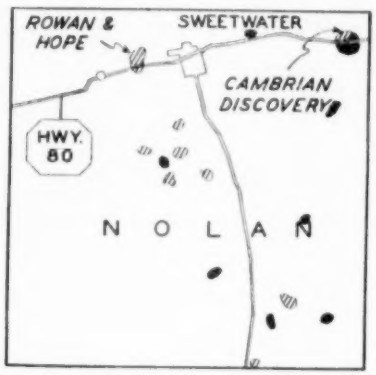
. . . Lower Ellenburger. Consists of a coarsely crystalline, cherty, and dolomitic limestone in the basal part. Top of the Cambrian falls in the Ellenburger limestone.

Exploratory drilling elsewhere in Nolan and Fisher counties proved earlier pools to be found along theories on the possibility of the subsurface structural ridge running approximately north-south from northern Coke County, through Nolan County and extending into Fisher County. Along the east side of this structure, in Nolan County, discoveries during the year included the Ellenburger, southwest and also east of Hylton pool, and Cisco limestone to northwest of Hylton. Continuing up the east side of the county, a King sand well was added, new Ellenburger south of White Flat field, and an Ellenburger discovery northeast of Sweetwater. New Canyon sand production was established and extensions made to the Lake Trammel pool southwest of Sweetwater.

Chart of the Cambrian formations as identified in Central and North Texas, and in southern Oklahoma.

Drilling was on the increase throughout North and West Central Texas. In North Texas, District 9, the year's total wells drilled was 3,675, up 470 from 1952. In depth classification, the gain was 262 for wells under 2,500 ft., accounted for mostly in Young and Wichita county fields. In the 2,500-5,000 ft. class, the increase was 28. Wells from 5,000-7,500 ft. increased 174, which takes in those drilled to the Caddo and Caddo conglomerate in Montague, Cooke, and Jack counties; and Strawn wells in Grayson County. In 1953 there were three wells drilled in the 10,000-12,500-ft. range, compared with one in 1952. The deepest test drilled this year was Humble Oil & Refining Co. 1 Williams, Grayson County wildcat which had total depth at 14,363 ft.

In West Central Texas, District 7-B, completions in 1953 totaled 2,790, which was an increase of 455 for the year. In depth classifications this increase was 241 in wells below 2,500 ft., 9 in wells between 2,500-5,000 ft., and 205 in wells from 7,500-10,000 ft.



Da k areas show development and discoveries made during 1953.

WEST TEXAS

Permian Basin Scene Of Many New Pools

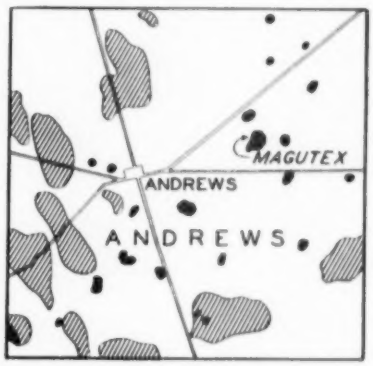
By Carl Hoot

NEW pools in the Permian basin of West Texas were found with near clockwork regularity throughout 1953. No one discovery has been classed as a major-field opener, at this time, but the aggregate number of lower Permian (Wolfcamp) and pre-Permian strikes will add up to sizable new reserves.

Total discoveries for this area will number upwards of 100, and of that number, 36 have been completed in the deeper horizons. These figures do not include upper and middle-Permian discoveries, nor some of the deep wildcats which finished as small producers.

The most significant West Texas discoveries of the year were those in Andrews County which found oil in deep rocks. These ranged from the Wolfcamp to Devonian and Ellenburger.

Discovery of Magutex pool in 1952 on University land set off a drilling campaign throughout northeast and eastern Andrews County. The eastern half of the county accounted for four Ellenburger and six Devonian discoveries during the year. New discoveries, long extensions to those discoveries, and development of dual producers were on a fast scale, considering that most of them were finishing below 12,000 ft.



Dark areas are 1953 discoveries and development, mostly in pre-Permian formations.

Central Andrews County accounted for a number of important Wolfcamp strikes and long extensions drilled to those discoveries. These were mostly high-potential wells, and several were completed 1 mile or more from nearest production in the new field but were not carried on drilling reports as wildcats.

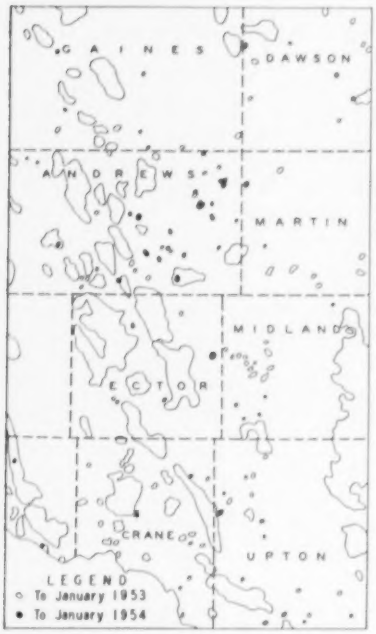
New Ellenburger production in older areas included one in the southeast portion of Block 12 field, one on the northwest flank of Emma field, and a couple of 1-mile extension wells in the Midland Farms—Ellenburger area.

Trend to deep drilling . . . The new phase of deep drilling in West Texas fields is not limited to Andrews County. It is reflected in pre-Permian discoveries ranging northwest along the Central basin platform fields from prolific Devonian gas-distillate strikes in Pecos County, through Crane, Ector, and Gaines counties.

There was also an increase in deep drilling throughout fields to the east in the Midland basin. Most of this activity was confined to Upton and Midland counties, but drilling below the Pennsylvanian reefs brought in a good Siluro-Devonian discovery near Vealmoor fields. Northwest Yoakum County, also geologically located in the Midland basin, had discoveries in the Silurian and Devonian rocks.

Reef drilling was revived to some extent in and around the fields of Howard, Borden, and Kent counties. In northern Howard, west of Vealmoor pool, Phillips Petroleum Co. and Oceanic Oil Co. brought in 1 Winans for

Review—Forecast Oil Discoveries



These West Texas counties received the most important discoveries of 1953. They ranged along the Central Basin platform fields in a northwest-southeast trend which follows the old producing areas. Most of the above discoveries are Wolfcamp or deeper.

1,764 bbl. per day from a Pennsylvanian reef section around 8,140 ft. The discovery well (Oceanic pool) was completed the latter part of August and by December Phillips and Oceanic had six producers in the pool.

Reef production was established west of the reef trend, into Dawson County, at Seaboard Oil Co. 1 Pettaway. Potential was 531 bbl. daily from pay at 7,887 ft.

Spraberry Trend . . . Completion of natural-gas outlets for wells in Spraberry Trend fields reopened some areas to production before the general opening on January 1, and well completions appeared on drilling reports in November. A new recovery process involving high-pressure fracturing *(see The Oil and Gas Journal, December 7, 1953)* showed promise of returning existing wells to profitable production. Successful application of the method would do much to revive drilling on a large scale in many of the Spraberry fields.

Midland County . . . This county received only moderate drilling of field and exploration wells following the Spraberry shutdown on the eastern side. Pegasus field was extended north and east, dual completions being made from the Devonian and Ellenburger in those sectors. Pennsylvanian extensions were made to the north of Pegasus and on the northwest sector a 1-mile extension was completed in Wolfcamp pay.

By the third quarter Midland County exploratory wells had increased to eight, which were scattered along the county's west side. In August, Cities Service Oil Co. and Forest Oil Corp. purchased a large track of land covering the west half of Block 41, T3S, T&P Survey. This previously undrilled and unsurveyed area is roughly 4 miles wide by 9 miles in length, and lies between Headlee pool in Ector County and Sweetie Peck pool in southwestern Midland County. Drilling of the block will await completion of seismic-survey studies.

Crane County . . . Lea-Ellenburger field was generally considered as the year's most important development. The discovery well was completed in January 1953 and by year's end proved acreage was over 600 in the field proper. In addition, a 1-mile east extension ran high on the Ellenburger and completed as an excellent flowing well. A north extension well finished dually, Simpson sand being the field's second pay zone. The field discovery, Gulf Oil Corp. 1 P. J. Lea, also flowed oil on drill-stem tests from two zones in the Simpson.

Gas and distillate . . . Devonian production was added to previously shallow producing pools in Pecos County, which is situated on the south end of the Permian basin. Among the more prolific discoveries of rich wet-gas was Cities Service 1 Payton, which completed for over 100 M.M.c.f. of gas, plus 3,600 bbl. of distillate.

In the same area, but in Ward County, Luse & Ice 1-A Brictson was a Devonian discovery which also flowed over 100 M.M.c.f. of gas on potential test. Distillate yield was 28 bbl. per 1 M.M.c.f. By year's end, Cities Service and others had completed two Devonian gas-distillate wells in this area but production was held up pending unitization agreement. Meanwhile, Luse & Ice 1-A Brictson was producing as a separate lease. El Paso Natural Gas Co. was said to be taking 20 M.M.c.f. of gas a day from the well, plus approximately 700 bbl. of high-gravity oil.

Not all deep . . . While discovery-evidence definitely points to deep drilling as the new phase for West Texas, one hardy operator went into a section of land surrounded by dry holes and in a short time established a very economic field situation. This venture was Trebold Oil Co. 1 Radford Grocery Co., located in the approximate center of Section 1, GC&SF Survey, which is in the south end of Upton County.

The well was drilled to 1,754 ft. and completed from 10 ft. of Grayburg sand. Gravity of the oil was low at 26°, but completion potential through ½-in. choke was a happy 959 bbl. a day. Succeeding wells, on 10-acre spacing, were even better. Some potentials exceeded 2,000 bbl. of oil daily, and a drilling program was mapped for the new area. By year's end the field, known as Rodman-Noel, included 10 flowing and 4 pumping wells. Four producing zones in the Grayburg had a gross of 130 ft. of pay and an average thickness of 73 ft. Average porosity was estimated at 10 per cent, since all wells were drilled with cable tools. Structure description is an anticline, with prominent southwest and southeast nosing. There is no gas cap on the reservoir and original oil-water contact was a plus dataum 560 ft.

SOUTHEAST NEW MEXICO

Generally Good Year is Experienced in All Areas

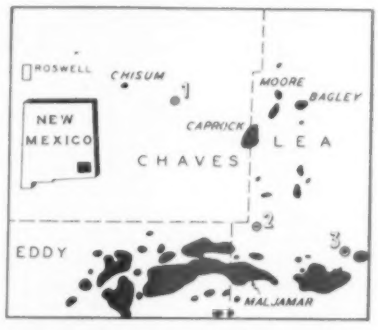
By Carl Hoot

SOUTHEAST New Mexico operators had a good year during 1953, which saw three Devonian or Siluro-Devonian fields opened, four in the Wolfcamp, and five in Pennsylvanian pays. There were other discoveries of middle and upper Permian age, and a number of new pays and extensions in new fields which were of wildcat status but are not included in these figures.

Lea County drilling through the year exceeded, in numbers, that of any other area in the Permian basin. Active rigs held steady around 130-135 and wildcats averaged from 15-20.

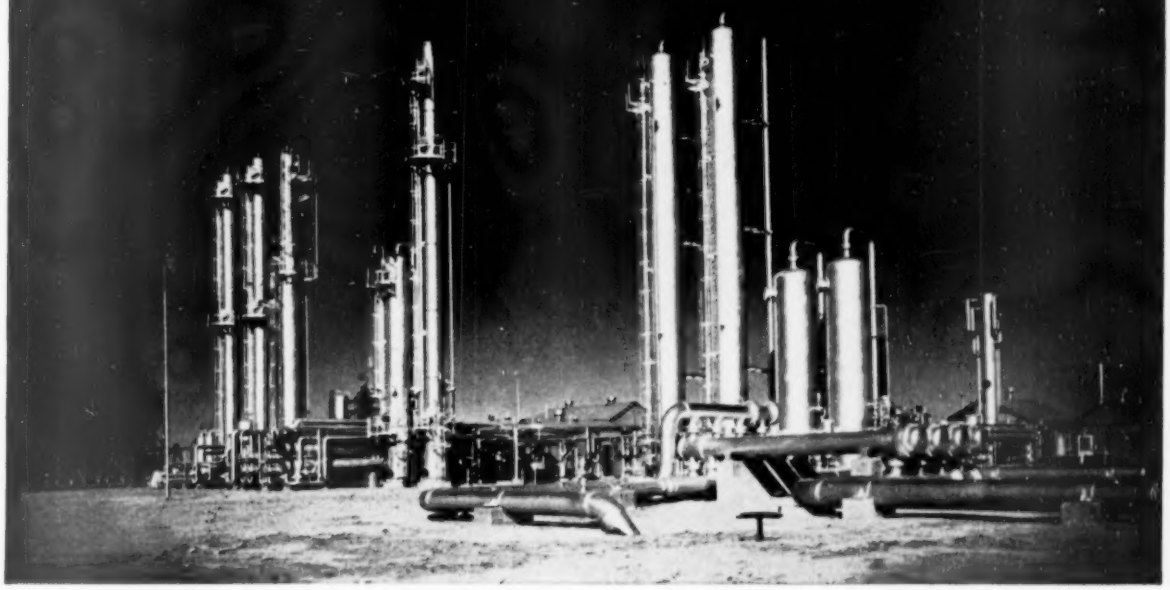
The accompanying map shows the three Devonian discoveries in relation to existing fields of a portion of Southeast New Mexico. The fourth Devonian well was an extension well in Bronco field.

The deep wells which have stimu-



Devonian discoveries of 1953 are numbered 1, 2 and 3, above; have stimulated new interest in deep rocks.

EXPERIENCE MAKES THE BEST PUPIL



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lated interest in the potentialities of Devonian, or Siluro-Devonian, rocks on the northwest shelf of the Permian basin are numbered on the map. These are:

1. Republic Natural Gas Co. and Seaboard Oil Co. 1 White Ranch, 34-11s-29e, in Chaves County. Completion potential was 294 bbl. of oil a day from Siluro-Devonian pay between 8,719-79 ft. Second well for the pool, a south offset, flowed 2,620 bbl. daily from approximately the same pay depth.

Republic Natural's discovery is the first for a broad sweep of country through eastern Chaves County where Devonian rocks are climbing northward and westward toward a pinchout near Roswell. It is located 22 miles from nearest Devonian production to the east and about 12 miles from Devonian production to the west. Devonian production is found around 11,300 ft. at East Caprock and 10,500 ft. at Moore. To the west is Chisum field, a 1950 discovery which found a small volume of high-gravity oil around 6,500 ft. The White Ranch discovery is expected to bring about additional detailing with seismograph throughout the area.

2. Continental Oil Co. 1 Anderson Ranch, 11-16s-32e, Lea County. Completion was from Devonian pay at 13,373-13,508 ft., flowing 1,968 bbl. of oil daily. This well is on a large seismic structure, and has moved Devonian production about 25 miles southward from the East Caprock-Moore area, and about 10 miles northward from Buffalo Oil Co. 12-B Baish. The latter discovery, at 13,600 ft., is in the eastern end of Maljamar field where production is found at 3,400-4,500 ft. Nearest Devonian production to the east is at Denton field, largest Devonian strike so far found in Southeast New Mexico.

Further drilling at Anderson Ranch added the Wolfcamp as a second pay. Continental 4 Anderson Ranch was a long northwest extension and new pay discovery in the Wolfcamp at 9,669 ft. Potential was 1,758 bbl. daily. Later Continental 2 Anderson Ranch, east offset to number 4, finished as a 1,288-bbl. well in Devonian pay at 13,382 ft.

Continental 1-Q State, 1½-mile southwest stepout to the field, drilled to 13,689 ft., then plugged back to make a 500-bbl. well from 20 ft. of Wolfcamp pay between 9,849-69 ft.

3. Western Natural Gas Co. 1 Millard Eidson, 35-11 6s-35e, Lea County, was an October Devonian discovery. Nearest deep production is Lawton Oil Corp. 1-L State, 3 miles to the northeast. This well found the Devonian dry in drilling to 11,984 ft. but plugged back to make a Pennsylvanian discovery at 11,430 ft.

There were other discoveries which attracted considerable interest during the year. In August, Forest Oil Corp. completed 1 Federal-General American Oil Co. for better than 1,000 bbl. daily, flowing through ½-in. choke. Pay at 7,774 ft. was generally called Pennsylvanian. Location of the well is in a new province, geologically known as a pre-Permian intermediate area, which gave importance to the find, but oil production declined rapidly, and a north offset drilled by Pacific Western Oil Corp. was dry at 8,550 ft.

The New Mexico portion of the Delaware basin came in for considerable drilling during the year but pre-Permian production was not found. Richardson & Bass 1 Fidel-Federal in 27-21s-29e, Eddy County, drilled to 15,611 ft., then plugged back to 6,980 ft. to make a 175-bbl. flowing well. Lowest formation reported was the Silurian at 14,570 ft.

Richardson & Bass 1 Harrison-Federal, 12-25s-30e, Eddy County, set a depth record for both Southeast New Mexico and West Texas at 16,705 ft. At year's end the well was still testing around 12,320 ft. and making gas at the rate of approximately 1,500,000 cu. ft. daily, plus 4 bbl. of distillate an hour. Formation tops have not been picked below the Bone Springs, but at total depth this well probably was still in the Permian.

OKLAHOMA

Drilling Soars as Completions Rise 31 Per Cent

By John C. McCaslin

DRILLING activity in Oklahoma soared to phenomenal highs in 1953. Total completions in the Sooner State were 7,593, up 31 per cent over the previous year. Wildcat completions kept a steady pace during the year, but did not show a sharp increase over 1952. Total wildcat completions in the state were up about 1 per cent over the previous year.

The state's most important exploratory developments took place in the far northwestern corner of the state in the Panhandle, Central Oklahoma, South-Central Oklahoma, and on the northern shelf of the Anadarko basin.

Oklahoma Panhandle . . . The far northwestern extension of Oklahoma was one of the most active areas in the Hugoton embayment of southwestern Kansas and northwestern Oklahoma (See Fig. 1).

Continued drilling is rapidly enlarging the new Keyes (basal Morrow) sand gas field of northeastern Cimarron County. This gas area, designated as North Sturgis and Sturgis pools (see Fig. 2), was opened early in the year at Coltexo Corp. 1 Purdy in 20-6n-9eCM. Keyes sand gas wells now extend through the full lengths of Townships 5n-9eCM and 6n-9eCM. This new gas reserve lies about 15 miles west of the western flank of the vast Hugoton gas field.

During the latter part of the year good oil production was found on the east flank of this new gas area. Both gas and oil are found in the Morrow sand of Pennsylvanian age.

East of Cimarron County first oil production in Texas County in the Panhandle was established at United Producing Co. 1 Kelly. Swabbing netted 84 bbl. of 37°-gravity oil per day from

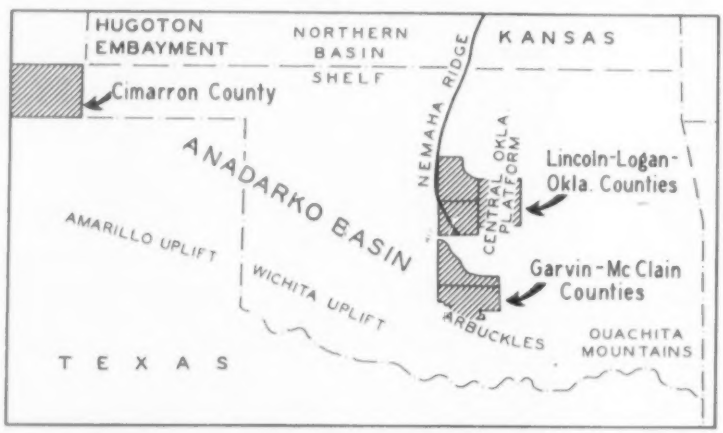
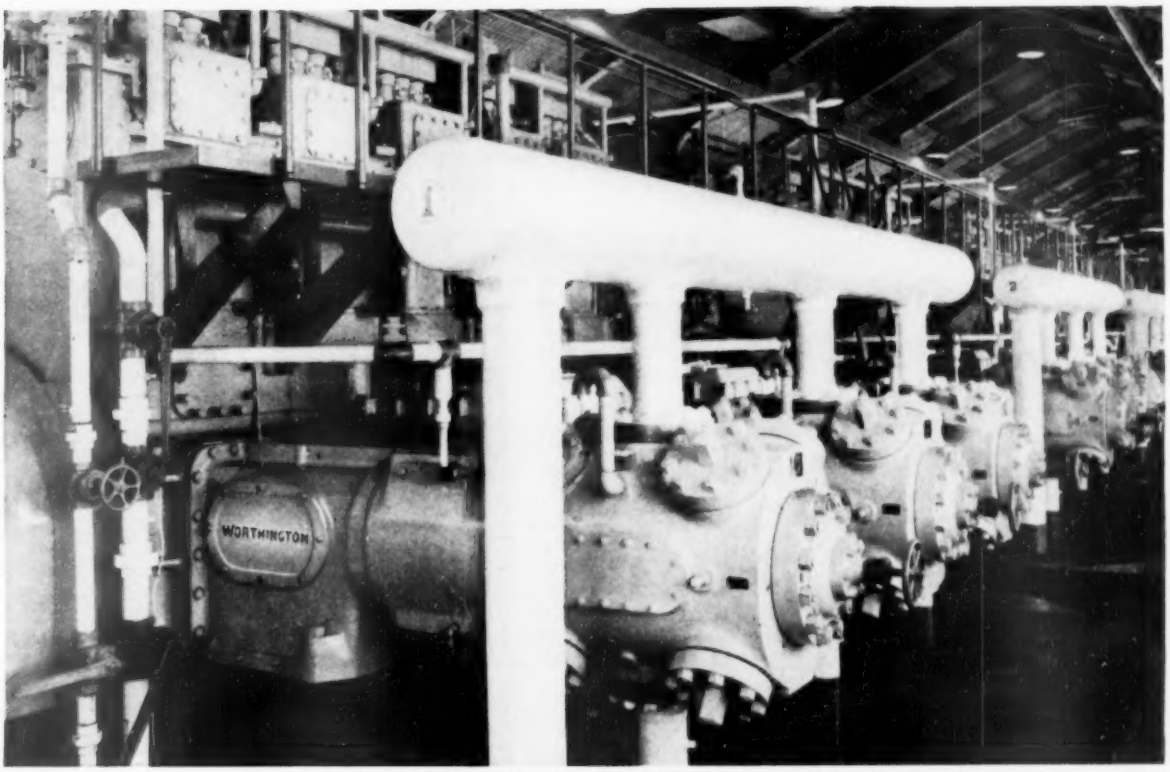


Fig. 1 . . . Oklahoma's most important exploratory developments took place in the Panhandle, central and south-central regions, and on the northern shelf of the Anadarko basin.



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Review—Forecast Oil Discoveries

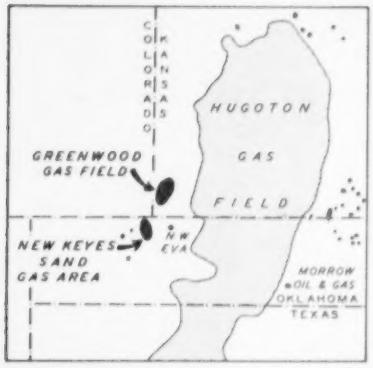

Fig. 2... Important Pennsylvanian discoveries in the Hugoton embayment highlighted Anadarko basin activity.

Morrow sand perforations. The significant discovery, named Northwest Eva pool, lies 4 miles east of Cimarron's new Sturgis gas area, and about 8 miles west of nearest Hugoton production. (Fig. 2). Northwest Eva pool has two wells completed and six other prospects in various stages of progress. The 3 Kelly swabbed 70 bbl. of oil per day from perforations at 4,428-40 ft., and the 4 Kelly was testing at year's end. It flowed at the rate of 11 bbl. of oil per hour. Another well in the pool showed for gas production.

This new Morrow sand oil reservoir was one of the highlights of 1953 exploratory activity in the Panhandle portion of the Anadarko basin. In the southeastern part of Texas County the search for oil in this primarily gas-producing area received a boost at The Texas Co. 1 Flowers-Johnson-Eldridge unit. Oil flow averaged 22 bbl. of 41°-gravity oil per hour on tests of the Morrow sand from perforations at 6,820-54 ft. The new oil well is 1 mile northeast of the 1 Cook, recent Morrow gas discovery, and 1 mile southeast of the 1 Winfrey-Brown, which showed for 8,250 M.c.f. of gas per day from the Morrow sand at 7,075 ft.

Central Oklahoma . . . This portion of Oklahoma, which includes Lincoln, Logan, and Oklahoma counties, scored 27 new oil and gas discoveries last year. It is an old producing area, containing two of the state's best known oil fields, Oklahoma City and West Edmond. The three-county area lies to the east of the Nemaha ridge on the Central Oklahoma platform. (See Fig. 1).

Lincoln County, one of the state's heavily drilled areas, led the state in development activity. The Kendrick area of the county is rapidly becoming one of Oklahoma's biggest producing fields. Production in the area was opened early in the year in the Oswego lime and Prue sand. All wells in the area have reported high flow potentials. The county's other big new area is East Payson field with nearly 100 producing wells. This field was opened in 1952, but received big development in 1953.

The general Logan-Oklahoma County area has experienced a number of leasing and drilling campaigns over a period of years. Although the fields have been very prolific, the structural complexities characteristic of the area's anticlines have resulted in a large number of dry holes.

The most significant discovery in Central Oklahoma in 1953 was Macmillan Petroleum Corp. et al.'s Southwest Navina pool, opened last winter in the heart of a dry-hole area of Logan County. The field, located about halfway between Crescent and Edmond fields, has six producing wells. The discovery well flowed at the rate of 1,200 bbl. of oil per day on 24/64-in. choke from the second Wilcox sand. The well drilled from Pennsylvanian strata into Sylvan shale to establish the presence of a sharp elongate faulted anticline, similar to Crescent pool. The field also has Simpson and Pennsylvanian-Layton sand production.

Oklahoma County's most significant discovery in 1953 was at Northwest Edmond, opened last winter at Calvert Drilling Co. and Huffman & Malloy et al. 1 Salisbury, 4 miles north of Edmond. The gas-distillate pool has both second Wilcox sand and Simpson dolomite production.

South-Central Oklahoma . . . McClain County was the most active exploratory area in this section of the state. (See Fig. 3). The county's score of new discoveries for the year was six new pools.

The most significant discovery was deep North Freeny pool. The discovery well flowed 411 bbl. of oil per day from the Tulip Creek. The Freeny area also has Bromide sand production. All wells in the Freeny area reported high flow potentials.

Northwest Lindsay pool was another significant discovery. The discovery well was finaled for 1,463 bbl. of oil per day from the McLish sand. The second well in the new pool was completed late in the year.

Garvin County's Northeast Purdy Springer sand area was one of Oklahoma's high-interest spots. The Northeast Purdy area production was opened in late 1952 at Magnolia Petroleum Co. 1 Duncan for an initial production of 566 bbl. of oil per day from the Springer sand. The field has both

Fig. 3—The most significant discovery in South Central Oklahoma was deep North Freeny pool in McClain County. McClain County had six discoveries in 1953.

Springer sand and Hart sand production.

This new Springer sand trend lies on the eastern rim of the Anadarko basin just west of the famed Golden Trend. Production in the Golden Trend fields is from the Pennsylvanian Deese sand and the Ordovician Simpson series. No Springer is found in these wells. An active program of connecting the area between the Purdy pools and the Golden Trend has been under way in recent months with good prospects of success. Development of the Purdy area has been characterized by high-volume producers and good outpost success. Hart sand production has been established between the Purdy area and the Golden Trend, and drilling for this sand is active off the north flank of the Purdy area and west flanks of Golden Trend production.

Anadarko northern shelf . . . Two of the biggest discoveries of 1953 in Oklahoma were made on the northern shelf of the Anadarko basin. (Fig. 4).

Champlin Refining Co.'s Yellowstone

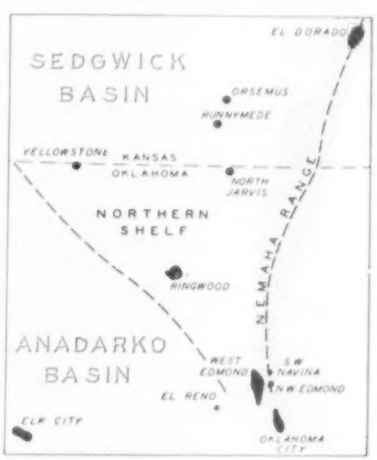

Fig. 4... Two of the year's biggest discoveries in Oklahoma were made on the northern shelf of the Anadarko basin.

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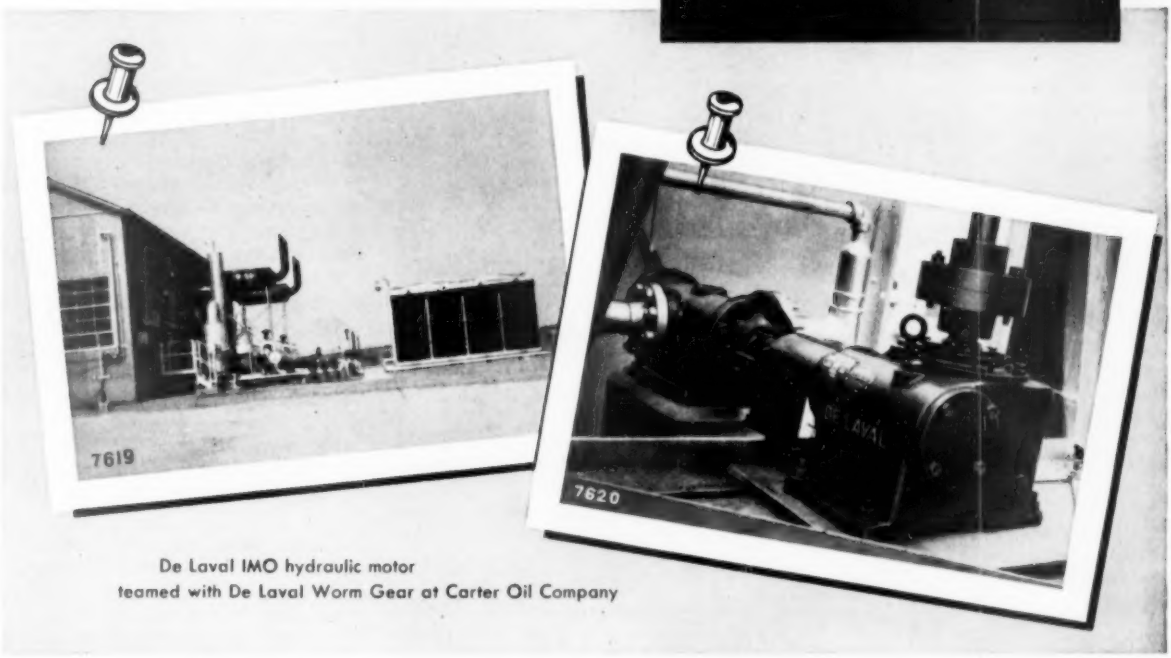

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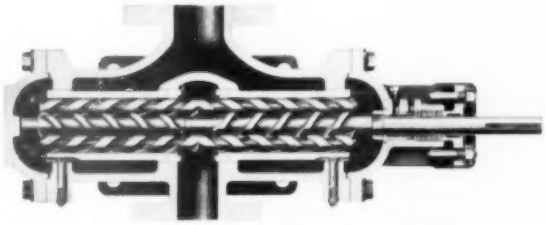

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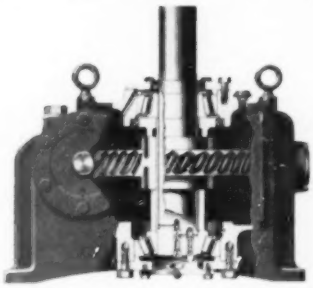

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pool in rank Woods County in the northwestern part of the state opened Arbuckle production in a remote wildcat area. The discovery well of the field was completed for only 25½ bbl. of oil per day, but tests of the Simpson showed excellent possibilities of gas production. The significance of this strike lies in the fact that a large area of northwestern Oklahoma and southwestern Kansas (the northern shelf of the Anadarko basin and the southern portion of Kansas' Sedgwick basin) now lie open for Simpson prospecting. Two wells were completed as offsets and a third one is drilling.

At the northern border of Oklahoma in Grant County, Union Oil Co. of California opened a good Simpson pool at North Jarvis. This rank discovery flowed 311 bbl. of 42°-gravity oil per day on ½-in. choke on its first 24-hour production test. The discovery is located 15 miles southwest of the nearest Simpson production in Caldwell field, Kansas, and about 25 miles northwest of nearest Oklahoma Simpson production at East Pond Creek and Rich Valley fields. The pool was successfully confirmed and the third well is under way.

KANSAS

Operators Set New Drilling Record

By John C. McCaslin

KANSAS operators set a new drilling record in 1953 with 4,783 wells finaled, up 5 per cent over 1952. Wildcat completions in the Sunflower State were also up 5 per cent. More than 16,200,000 ft. of hole was dug to set this new record.

The most significant developments last year were in the following areas (see Fig. 1): Hugoton embayment, (2) Salina basin, (3) Norton County in northeastern Kansas, (4) northern shelf area of the Anadarko basin, and (5) southern portion of the Sedgwick basin.

Fig. 1—Important exploratory developments were shared by five areas in Kansas during 1953.

1. **Hugoton embayment . . .** The Hugoton embayment, which is the northerly extension of the Anadarko basin, was consistently the Mid-Continent's most active rank wildcat area this year. Exploratory drilling resulted in new oil and gas discoveries in 1953 (Fig. 2).

Excepting the huge Hugoton gas field, the embayment is a sparsely productive area. The embayment includes the area between the Las Animas arch

Fig. 2—Kansas' most significant developments in 1953 took place in the Hugoton embayment.

in eastern Colorado and the Central Kansas uplift. The recent score of discoveries in the embayment, particularly on the flanks of Hugoton field, suggest opportunities for uncovering more important producing areas in southwestern Kansas.

The most significant new gas-producing area in Kansas is located just west of Hugoton field at Greenwood field in Morton County (see Fig. 2). Continued drilling is rapidly proving the field as one of the most important gas-producing areas in the Mid-Continent region. The big field produces from the Topeka-Lansing lime with three wells having Morrow sand pay. The pool has been extended into Baca County, Colorado. An area about 18 miles north and south along the Colorado line in Morton County, Kansas, has been proved productive.

An important gas discovery opening new reservoirs in Seward County was made by Cities Service Oil Co. at its 1 Holt "B," C NW NE 28-32s-34w, promising a new deeper pay horizon for vast Hugoton field.

Located in Hugoton gas field of the tristate area of Kansas, Oklahoma, and Texas, the discovery well flowed at the rate of 17,700 M.c.f. of gas daily from the lower Topeka limestone formation of Pennsylvanian age at a depth of 4,200 ft. This is the first production established in this formation in sprawling Hugoton field. The new producing horizon is deeper than the regular Hugoton pay which is normally found at 2,700 ft. Nearest production from this new zone is in the Greenwood gas area, 45 miles west. Three other prospective producing horizons deeper than the regular pay in Hugoton field will be tested before the new well is completed.

Sparsely productive Hodgeman County in the heart of the embayment received a new oil pool early in the year. Atlantic Refining Co. opened Saw Log Creek pool at 1 Hall (Fig. 2). Initial production was 695 bbl. of oil per day on the pump from two zones in the Pennsylvanian-Marmaton lime. Late in the year Gray County in southwestern Kansas received its first oil pool, a small Lansing lime producer.

Ford County's 1953 strike is Helmers pool, a Mississippian gas discovery. Successful wells in the East Kismet area of Meade County have extended that Morrow gas-producing area. Considerable extension activity took place in the Liberal-Light area. Three new Mississippian oil pools were opened in Finney County on the northeast flank of the Hugoton gas field area.

2. **Salina basin . . .** The year's most significant discoveries in this basin were Salemsborg and Lively pools. National Associated Petroleum Co. opened a Viola pool at Salemsborg for flowing production of 200 bbl. of oil per day. Also in the southern end of the basin Lively pool was opened flowing 15 to 20 bbl. of oil per hour from the Mississippian. These two discoveries, along with recent drilling activity in Smolan pool, and scattered wildcat tests in southeastern Nebraska, have further increased interest in this basin which has no production except along the southern margin.

3. **Norton County . . .** Norton County's new Columbia field, located about 8 miles southwest of Norton in northwestern Kansas, is one of the best strikes on the northern end of the Central Kansas uplift in recent years.

Jones-Shelburne-Farmer, Inc., completed the pool opener for 200 bbl. of oil per day natural in the Arbuckle. The pool has 20 producers. It was discovered as a result of a play for a pinchout against the granite.

4. **Northern basin shelf . . .** Four new gas pools were opened on the production-shy northern shelf of the Anadarko basin in 1953. The shelf area extends into Clark and Comanche counties from Oklahoma, and is that area south of the Sedgwick basin lying to the west of the Nemaha granite ridge.

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Review—Forecast Oil Discoveries

First gas production in Comanche County was opened last spring at Barbara Oil Co. 1 Robbins Ranch, opening Robbins Ranch pool. The Robbins Ranch area, which is 3 miles west of Barber County's Southwest Skinner gas pool, also a 1953 discovery, produces from the Mississippian.

Recent Simpson oil discoveries in Grant and Woods counties, North-Central Oklahoma, have enhanced the outlook for finding more oil in the rank area to the north in Kansas. Facies changes from basinal sands to platform limestones in the Pennsylvanian create a definite oil-producing possibility on the northern basin platform, particularly in the Clark-Comanche county area.

5. **Sedgwick basin . . .** Eight new oil and gas discoveries were completed in the southern portion of the Sedgwick basin, which is the area lying between the southeastern limits of the Central Kansas uplift and the buried Nemaha granite ridge.

The state's most important strike of the year was The Texas Co.'s Orsemus pool in Kingman County (Fig. 3). The

Fig. 3—New Simpson strikes highlighted Sedgwick basin activity in 1953.

Simpson strike was finaled with a bomb potential of 1,901 bbl. of oil per day. The remote pool is about 42 miles north of North Jarvis Simpson pool at the northern end of the indicated new vast Simpson producing area bounded on the east by the Nemaha granite ridge, on the south by El Reno Simpson-Wilcox wet-gas pool, and on the west by Yellowstone pool in Woods County, Oklahoma.

The most significant gas discovery in this area was in rank Harper County where The Texas Co. opened Runnymede pool, a Simpson producer, last spring. The discovery well was completed for 3,000 M.c.f. per day. These two Kansas discoveries add incentive to the intensified search for Simpson production on the northern shelf of the Anadarko basin and in the southern portion of the Sedgwick basin.

ARKANSAS

Steady Pace Maintained Throughout the Year

By John C. McCaslin

DRILLING activity kept at a steady pace in Arkansas in 1953. Operators opened up 12 new producing areas. Considerable core-testing and wildcatting was done in central and eastern Arkansas counties during the year. Geophysical work was high throughout 1953.

The two-state Springhill field of Arkansas and northern Louisiana received two new pays during the year, the Hill sand and the Pettit lime. Regular pay in the field is the Tokio. New producers on the west and southern flanks of the rapidly expanding field give considerable promise for extension of the field to the west. The limits of the field in the Springhill town area and across the state line into Columbia County are practically defined. The western and southwestern flanks of the field in Louisiana are still prospective producing areas.

The northwestern gas area in Arkansas had a busy year. Linville field in Johnson County was confirmed. The gas area was opened in 1951 by Pure Oil Co. with gas production from the lenticular sands in the thick Atoka formation of Pennsylvanian age. This area of Arkansas produces only dry gas with no oil associated with the gas. The fields in the area lie along east and west trending anticlines, sometimes faulted. There are 25 producing areas in this section of Arkansas, all producing from the Atoka but one which has Hale production.

Wataluia field is a new sweet-dry gas reservoir in Franklin County, in West-Central Arkansas. Three rigs are in the new field. The discovery well was completed in October for a calculated open flow of 16,000 M.c.f. of gas per day from the Atoka sand. This new significant find is located 2½ miles northwest of White Oak field and 4¾ miles northwest of Lone Elm field, and is located on the same surface anticline as Lone Elm wells.

Miller County's West Fouke field in the extreme southwestern part of the state now produces from three zones, the upper Paluxy, Paluxy, and the Tuscaloosa. The new pay in the field is the upper Paluxy. West Midway field in Lafayette County was one of the best discoveries of the year. It was opened early in the year at McAlester Fuel Co. 1-B McDonald, in the upper part of a 28-ft. effective pay section in the Smackover lime.

Saulsbury sand pay was extended ¾ mile to the southwest in the Rogers area of East El Dorado field in Union County. Union County's Rogers area has production in the Saulsbury, Meakin, Graves, and Tokio sands. The new extension promised to encourage continued active development in the area.

NORTH LOUISIANA

Drilling Activity On Par With That in 1953

By John C. McCaslin

DRILLING activity in North Louisiana was on an even keel with 1952. Operators completed 1,295 wells in the area, while exploratory drilling turned up 17 new oil and gas pools. Development work centered on 1952's Springhill field find in the northwest, while the search for Wilcox production highlighted east-central Louisiana activity.

Bossier Parish in northwestern Louisiana saw the confirmation of new Redland field. The confirmation well was completed for oil, while the discovery well of the pool was finaled for gas - condensate. The pool produces from the Travis Peak. A new gas-condensate pool was also opened in Bossier Parish at Willow Chute with production from the Bodcaw sand of the Cotton Valley. Blackburn field is a near Bodcaw sand gas-condensate area in Claiborne Parish.

North Antioch pool is a new Claiborne Parish oil area. It was finaled for a flow of 200 bbl. of oil per day from the Bodcaw sand. In northeastern Louisiana in Tensas Parish Heep Oil Corp. and Associates completed a discovery on Harper's Island at 1 Magnolia-Learned. The opener of Harper's Island field flowed 166 bbl. of oil per day from the Massive sand of the lower Tuscaloosa. This new pool is located about 4½ miles southeast of Locust Ridge and 5 miles west of Rodney field in Jefferson County, Mississippi.

Wilcox strikes . . . The search for Wilcox production was stepped up again in 1953. The Wilcox area of Louisiana extends from Grant Parish through LaSalle, Catahoula, and into Concordia Parish. Grant Parish reported one Wilcox hit, while LaSalle recorded one

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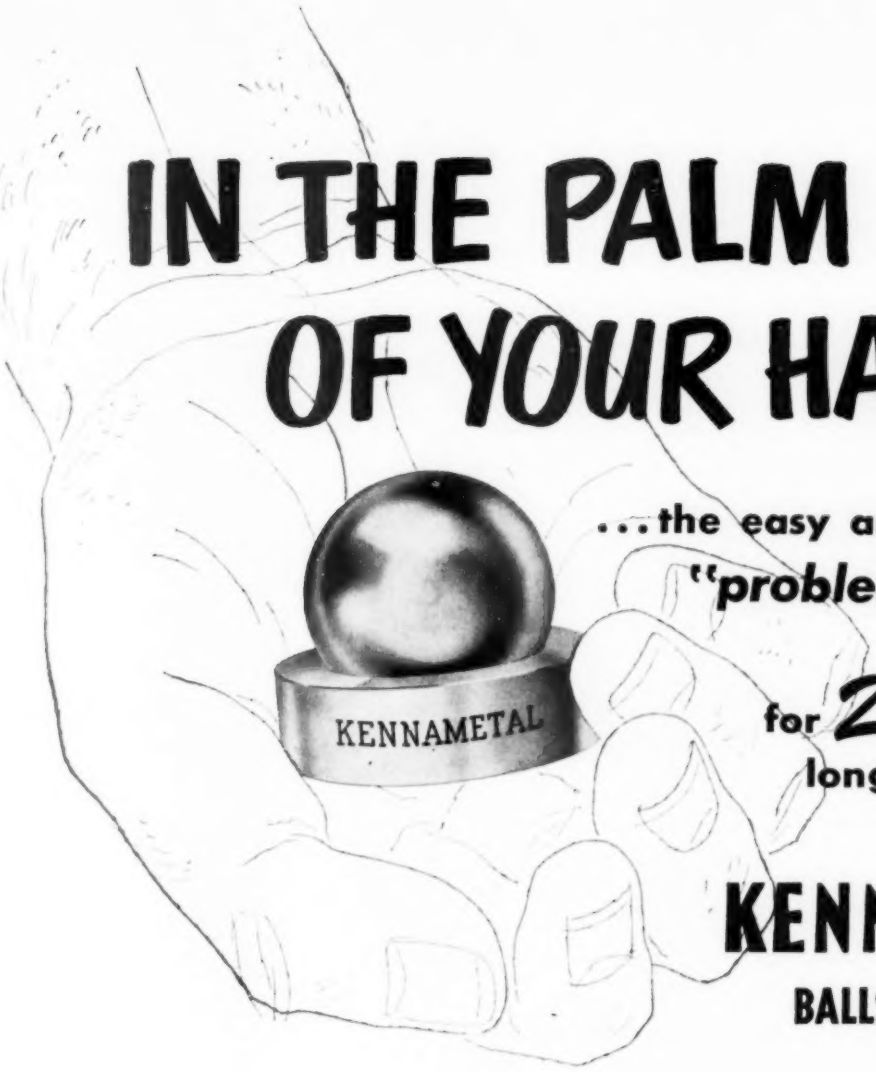

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strike. Concordia Parish led the area in new Wilcox pools with five. (See map.)

The confirmation well to the northwest extension of Wildsville field was completed in Concordia Parish flowing 110 bbl. of oil per day from the Wilds sand. The Horseshoe field discovery well was finaled flowing 163 bbl. of oil per day from the upper part of a 14-ft. net oil sand. Esperance Point field in eastern Concordia Parish was extended 1½ miles to the northwest. The extension well flowed 180 bbl. of oil per day from the Campbell zone of the Wilcox sand. Roseland pool was opened 2 miles west of Fairview field for 192 bbl. of oil per day. The three other new Wilcox pools in this parish are West Bee Brake, Bee Brake, and North Cocodrie Bayou. South Cocodrie Bayou field was opened in November for 58 bbl. of oil per day.

Wilcox discoveries in the trend area of East Central Louisiana and southwestern Mississippi are indicated by name.

SOUTH LOUISIANA

South Louisiana Spurts Ahead During Last Half

By Neil Williams

SOUTH Louisiana experienced a decided upturn in wildcatting during the last half of 1953. This was felt throughout the entire area but was particularly felt in the southeastern sector, in Plaquemines, Lafourche, and Terrebonne parishes, where drilling activity reached an all time high. During November and December there were more than 60 wildcat operations under way in these three parishes alone.

Activity was boosted by the gradual resumption of offshore operations occasioned by congressional legislation settling ownership claims of the federal Government and the respective states to offshore areas. Further intensification of offshore development is anticipated during the next few months.

Increased exploration and development was reflected in a mounting list of discoveries, both in new fields and in major extensions and opening of additional producing horizons in existing fields. Especially significant were discoveries in deeper horizons. Discoveries at 12,000, 13,000, 14,000-ft., and even deeper levels became successively more common.

Highlighting deeper discoveries was the opening of oil production below 17,000 ft. on the north flank of the Weeks Island dome, in Iberia Parish. This not only is the deepest production in Louisiana but at the time broke the world's deep-producing record, previously held in California. This record since has been rebroken by new deeper production opened in California. Weeks Island, however, continued the scene of the greatest concentration of deep production and development with at least a dozen wells producing from depths below 15,000 ft.

Conspicuous among the deeper producing areas discovered during the year was Hollywood field, near Houma, in Terrebonne Parish. In this area, opened by Tide Water Associated Oil Co. early in the year, prolific gas-distillate production was established in abnormally high-pressure sands below 14,300 ft., as well as in 12,000-ft. and 13,000-ft. zones. This production already has been

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At Cote Blanche, in St. Mary Parish, 10 miles southeast of the deep Weeks Island production, one of the oldest known salt domes on the Louisiana coast, The Texas Co., in October, completed a good oil-discovery well in a sand at 15,790-15,810 ft. Other production was opened on this dome in shallower sands.

The Texas Co. also opened oil production at 14,000-ft. levels at its Dog Lake dome, in the tidal marsh area of southern Terrebonne Parish. Dog Lake is one of the earlier geophysically discovered domes, on which The Texas Co. has been carrying on exploration continuously since 1927.

Prolific gas-distillate production at depths below 14,000 ft. was established by Superior Oil Co. in the Deep Lake area on the large Rockefeller game reserve in the marshes of southern Cameron Parish, in the southwestern corner of the state.

Bay Junop, in the tidal marshes of Terrebonne Parish, and, like Dog Lake, one of the earlier geophysically discovered salt domes, on and around which The Texas Co. and others have been exploring steadily, was found productive for the first time during the year. First production for this dome was found in 12,000 and 13,000-ft. sands on the north flank after approximately 30 attempts and 24 years of exploration.

Important flank-sand discoveries at Iowa, on the Calcasieu-Jefferson Davis parish line; Starks, on the Calcasieu-Beauregard parish line; Sorrento, in Ascension Parish; Napoleonville, Assumption Parish; and Anse La Butte, St. Martin Parish, typified the continued active exploration and development around most of the older known salt domes and fields. The above were only a few of the older fields and domes, on and around which important new discoveries were made.

Sohio Petroleum Co. and Gulf Refining Co., operating jointly, discovered and continued development in a sizable, multipay field in the Washington area of St. Landry Parish. Another promising area, productive from Sparta sand, was opened 4 miles to the west. Sinclair Oil & Gas Co. discovered still another field 8 miles to the south. Atlantic Refining Co., Stanolind Oil & Gas Co., and Humble Oil & Refining Co. discovered new production in other parts of the parish.

Sunray Oil Corp. continued a successful exploratory program in its Northwest Branch field, Acadia Parish, proving prolific gas-distillate production in multiple lower Frio sands below 10,000 ft. over a wide area. Late in the year, Tide Water Associated Oil Co. opened similar production in comparable sands at a wildcat test 2 miles northeast of Sunray's production.

An active exploratory drilling program carried on by Kerr-McGee Oil Industries, Inc., and Phillips Petroleum Co. on their extensive block in Breton Sound, offshore from Plaquemines Parish, also proved highly successful with six oil and/or gas fields being opened.

Possibly one of the most important new offshore fields opened during the year was at West Delta Block 53, Plaquemines Parish, where Continental Oil Co. established prolific oil production in at least four sands, ranging in depth from 6,300 ft. to below 12,300 ft.

MISSISSIPPI

Seventeen New Fields Added To State's Total in 1953

By Neil Williams

SEVENTEEN new fields were opened in Mississippi during 1953. These were exclusive of new reservoirs dis-

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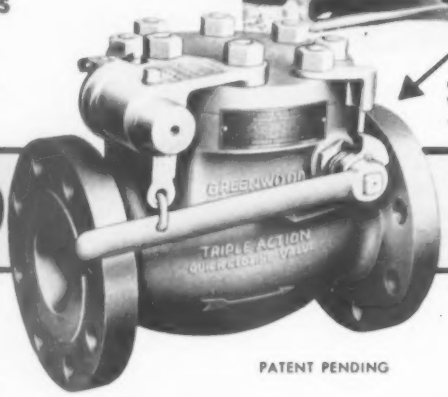

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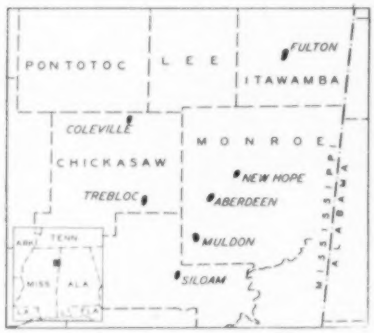
Review—Forecast Oil Discoveries

covered in many of the state's older fields.

Six of the new fields were in the Black Warrior basin of northeastern Mississippi, scene of an active exploratory play throughout most of the year. Ten were Wilcox sand discoveries in



Mississippi's Black Warrior basin producing areas.

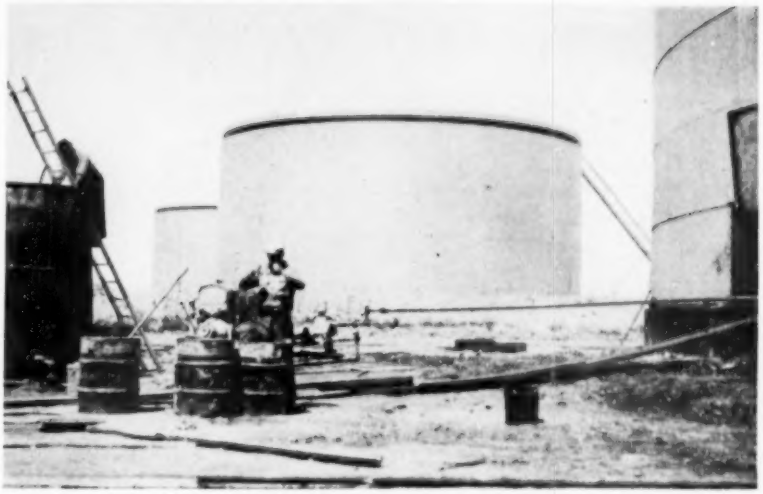
southwestern Mississippi, all in Adams, Wilkinson, Jefferson, and Franklin counties. The other, Buena Vista, in Jefferson County, found production in the lower Tuscaloosa.

Exploration in the Black Warrior basin, which until recently had been directed primarily to rocks of upper Mississippian age, so far productive only of gas and distillate, was highlighted late in the summer by Magnolia Petroleum Co.'s discovery of oil production in the Cambro-Ordovician Knox dolomite at New Hope, in western Monroe County.

Magnolia's discovery well, 1-A Snow, 7 miles north of Aberdeen, flowed initially at the rate of 29 bbl. of oil per hour through 7/64-in. choke, but rate of flow and pressures rapidly declined, and the well finally was completed on the pump, making initially slightly more than 200 bbl. of net oil with about 8 per cent water per day.

The current exploratory play in the Black Warrior basin originated early in 1952 with the discovery by Union Producing Co. of Muldon field, in southwestern Monroe County, 13 miles southwest of Magnolia's Knox dolomite discovery. The basin's only previous production had been Amory gas field, 20 miles to the northeast, discovered in 1926 and abandoned in 1937.

Aberdeen, 6 miles north of Muldon, in the same county, headed the list of discoveries in the basin during 1953. It was opened by Shell Oil Co. early in January as one of the more promising gas-distillate fields of the basin. Two additional wells have been completed in this field, and six at Muldon.



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Review—Forecast Oil Discoveries

Carter Oil Co. found sizable upper Mississippian gas-condensate production in its discovery well at Trebloc, 11 miles west of Aberdeen field, in southeastern Chickasaw County, but failed in its first confirmation attempt, the only other test drilled so far. The latter test was carried to the Knox dolomite, which also failed to show for commercial production.

Twenty miles to the north in the northern part of the county, Vaughey & Vaughey about the same time, in April, opened Colesville field with a dry gas well, also upper Mississippian. This was followed in July with a small gas-distillate discovery by Carter Oil Co. at Siloam, in northern Clay County, adjoining Chickasaw County on the south. More recently, a small gas well has been completed by Crow Well Service Co., near Fulton, in Itawamba County, most northerly and updip of the discoveries.

Exploration extended into the northwestern Alabama portion of the basin where promising showings were obtained in several tests. One of these, J. L. Duffy and Jack Herrington 1 Bedford, in Franklin County, bordering Mississippi, is in process of completion as a discovery well after flowing an unestimated volume of gas.

The 10 Wilcox sand discoveries in several counties of southwestern Mississippi reflect the continuation during 1953 of active exploration, under way several years, of Wilcox potentialities.

New incentive for exploration to potentially productive lower Cretaceous and deeper horizons in southern Louisiana was given by Gulf Refining Co.'s lower Cretaceous-Rodessa oil-discovery late in the summer at Soso, on the Jones-Jasper county line. Although this was not the first lower Cretaceous production for the state, it appears to be the best yet found with indications of becoming sizable in extent. The discovery, found in several zones below 12,000 ft., already has been confirmed; another well, more than a mile to the southeast, has reached the pay; and three other tests are being started.

Indications of first commercial production in the state from the Jurassic-Smackover horizon were given in a deep test drilled by Carter Oil Co. in northern Madison County, 4 miles southeast of Pickens field. In production tests of the new prospective pay in open hole at 12,130-12,487 ft., the well, 1 Brown, flowed at the rate of 223 bbl. of 49.4°-gravity condensate with 4,589,000 cu. ft. of gas daily. Because the gas carried hydrogen sulfide (5 per cent) which could not be burned because of its high carbon dioxide (73 per cent) and low methane content, the well was shut in as "temporarily abandoned," pending the time when facilities for handling the gas could be provided.

Development during 1953 in the Maxie-Pistol Ridge area of Forrest and Pearl River counties gave evidence of a major gas-distillate field. Maxie and Pistol Ridge, discovered in 1952 as separate fields approximately 4 miles apart, have been virtually linked by intermediate wells. Sizable extensions of productive limits also were made during the year in various directions, including the opening of first oil production in an extension well more than a mile northwest of the Pistol Ridge sector. Both Eutaw and Tuscaloosa sands have been found productive, as well as the Wilcox in the Pistol Ridge sector.

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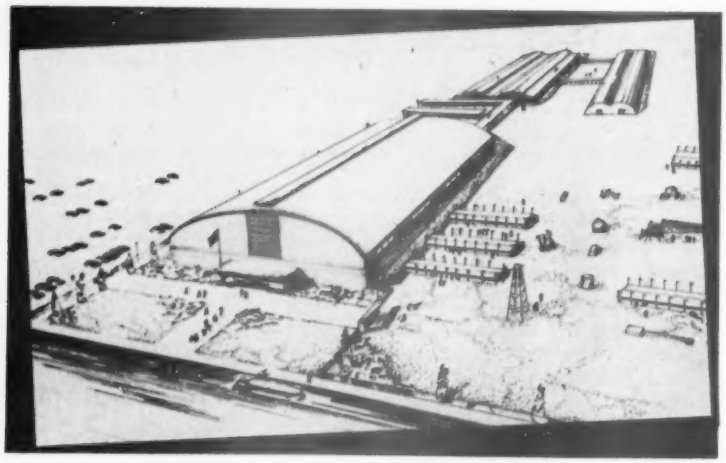

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SOUTHEASTERN STATES

No New Productive Areas But Deep Tests Promising

By Neil Williams

WILDCATTING efforts in the southeastern states of Alabama, Georgia, and Florida during 1953 failed to

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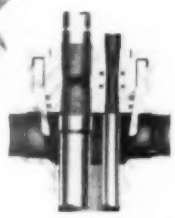

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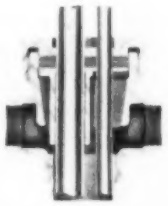
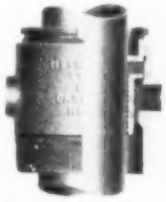


Type "SO-KP" Tubing Head

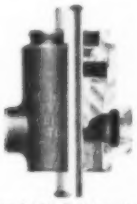
NEW



Type "E" Casing Head

Polished Rod Clamp-off Support

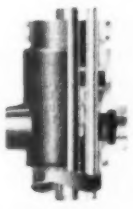
NEW



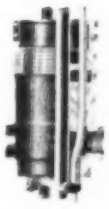
Type "JS" Tubing Head

NEW

Type "JSS" Stripper Tubing Head



Type "JSR" Tubing Head



Type "RC" Tubing Head

Type "F" Tubing Head

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Review—Forecast Oil Discoveries

establish any additional productive areas although promising oil showings were encountered in nearly all deep tests drilled in the South Florida basin.

One of the latter tests, a joint operation of Commonwealth Oil Co., Coastal Caribbean Oils, Inc., and Gulf Refining Co. located in western Dade County, 40 miles west of Miami, has prospects of making a producer, but at the close of the year had not been officially completed so its commercial value could not be determined. If successfully completed, it will open Florida's second field.

This test, 1 Wiseheart-State Board of Education, at latest report was waiting on pumping equipment after swabbing tests which yielded 256 bbl. of fluid per day, 20 per cent being 18.6°-gravity oil and 80 per cent water. Prospective pay is in the lower Cretaceous-Sunniland zone, open through casing perforations at 11,322-27 ft. This is the same horizon productive in Humble Oil & Refining Co.'s Sunniland field, 40 miles to the northwest in Collier County, and until now the state's only production. Sunniland, discovered in 1943, has 12 producing wells. No new development was undertaken there during the year.

Arrow points to Florida's indicated second oil field.

Two tests in Lee County, one drilled by Gulf Refining Co. 27 miles northwest of Sunniland field, and the other by Humble Oil & Refining Co. 11 miles farther west, also recovered some oil in drill-stem tests in the deep Sunniland zone. In Humble's test, the showings were sufficient to justify the company running casing for an attempt to complete the well as a producer. However, the tests did not prove commercial. Both wildcats were abandoned.

Far to the southeast on Key Largo, in Monroe County, Sinclair Oil & Gas Co. encountered encouraging shows in the same zone and went so far as to run casing for production tests, which also failed to produce commercially.

More than 30 wildcats were drilled in the state during the year, making this the most active wildcatting year in the state's history. All except eight of these were in the northern part, principally the Panhandle sector, bordering Alabama, in an extension of the exploratory play which swept across the southern part of that state following the discovery in 1952 of Pollard field, in southern Escambia County, near the Florida line.

Drilling in Alabama during the year totaled 103 wells, of which 75 were wildcats. Field wells included 16 at Pollard, now virtually drilled up, and 12 in the Gilbertown area of Choctaw County. Georgia reported seven tests.

CENTRAL AREA

ILLINOIS

Fracture Treatment Increases Completion Successes

DURING 1951 and 1952 only 40 per cent of all completions were suc-

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For complete details write for descriptive folder, A-1.

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cessful in Illinois. In addition to the 1,074 new producing wells completed in 1953, 88 old dry holes were opened up and recompleted as producing wells, in contrast to an annual average of 25 or 30 such workovers in previous years.

Dr. Leighton, chief of the Illinois State Geological Survey, has stated that "New methods of fracture treatment of wells are largely responsible for the increase in percentage of successful completions and number of successful workovers. Fracture treatment is an example of progress in technology by the oil industry which leads to the review of scientific data and the finding of more oil."

Summarizing drilling operations in the state during 1953 it is found that 2,165 wells were drilled for oil or gas in Illinois during the year, as compared to 2,149 completed during 1952. Of the 2,165 wells, 1,070 produced oil and 4 produced gas, so that approximately 50 per cent of all completions were successful. There were 16 new oil discoveries or extensions in Illinois in 1953.

new

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MISSOURI

The biggest news in the Illinois basin during 1953 was the opening of Trenton lime oil production on the extreme southwestern tip of the basin in St. Louis County, Missouri.

New Florissant pool has 20 completed oil wells, all in Sections 6 and 7-47n-7e, near the town of Florissant, about 16 miles north of St. Louis. The field is near Lambert field. Laclede Gas Co. opened the pool in August at 1 Lang, a gas-storage test, which cored oil saturation in the Trenton lime at 1,050 ft. The pay varies from 1,040-1,150 ft., depending on surface elevation. A minus of 500 ft. below sea level appears to define the producing limits of the new field, which is the most important development in the Illinois basin in recent years. Oil is of good gravity.

EASTERN KENTUCKY

In Eastern Kentucky during 1953, normal development continued in Big Sandy gas field with most work concentrated in Pike, Knott and Floyd counties. In Magoffin County the Oil Springs water-flood project saw the original small area expanded to considerable size. Wildcatting for primary reserves was generally unsuccessful although new gas pools were discovered in Bell County. There were no deep (Cambro-Ordovician) tests in the area under consideration.

MICHIGAN

Significant Developments Come Late in Year

By Don Carr

THREE late developments, all either completed or under test with commercial production assured as the year ended, may prove to be the most important events in Michigan's 1953 exploratory development.

The first of these three important strikes to be completed was a new Richfield oil discovery in Skeels field, Clare and Gladwin counties, which flowed at a restricted rate of 50 bbl. of oil an hour after acid treatment. This wildcat, a deeper-pay discovery, was completed by Don Rayburn and he had two other wells in the Richfield at year's end with commercial production assured definitely for one and almost a cinch for the other. Area is controlled by Rayburn and Sun Oil Co. Both will be very active here in the first half of 1954. Besides the Richfield, look for development of a Detroit River "sour zone" pool here also,

Review—Forecast Oil Discoveries

Important areas in 1953 are indicated.

along with perhaps spotty Dundee and Traverse oil development.

The most spectacular of all 1953 discovery wells was a very late strike in Bridgewater Township, Washtenaw County, by W. C. Taggart. This wildcat, drilled to about 1,120 ft., logged a natural flowing oil pay at 1,030 ft. which on rather extensive tests flowed from 14 to 40 bbl. of oil an hour through various choke arrangements. This wildcat, located on the southeast rim of the Michigan basin, is bound to be the spark to start a shallow drilling boom in practically untouched areas of Michigan.

Before the year ended, Taggart had other wells either drilling or under test in the area, while various independents were closing deals to drill from 1 to 5 miles away. Leasing was going ahead at a brisk rate in all directions from this wildcat, and major oil companies were keeping a close watch of developments in the district. The shallow oil, here, was encountered while drilling to explore the basal Salina-Niagaran and Trenton on a magnetometer picture. The results of this strike, if a field of even minor significance is developed, will be farreaching in spurting wildcatting in Michigan in 1954. Generally speaking, one new strike will prompt from 5 to 50 wildcats.

The third year-end strike which may prove to be of major significance was a Richfield sand discovery well in big Reed City oil pool, Osceola County, by Pure Oil Co. This well, which swabbed and flowed as much as 60 bbl. of oil a day natural before the entire 12 ft. of sand body had been drilled, will

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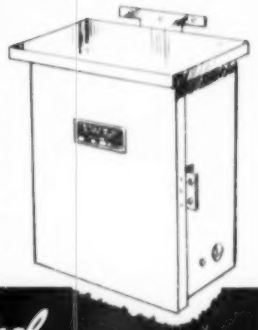

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Review—Forecast Oil Discoveries

probably mean that nearly all of Reed City pool will be redrilled for this deeper pay, as well as "off structure" acreage to the west and southwest for a possible continuation of this pay beyond the known limits of the Dundee-Reed City zone structure.

This Reed City field deeper-horizon development will be important in keeping Pure Oil Co., Ohio Oil Co. and Gulf Refining Co., major producers in the pool, active for another program in Michigan. None has been too active since the field was drilled up on the original program.

There have been other factors that will insure a shallow drilling boom in southern, southwestern, western and eastern Michigan in 1954. Two of the most active and successful field development areas in Michigan in the past year were Traverse oil pools, one in Muskegon County at a depth short of 1,900 ft., and the other in Van Buren County at a depth of approximately 1,200 ft. Ravenna pool in Muskegon County and Lawton field in Van Buren County, by virtue of their satisfactory development in the past 12 months, will stimulate the search for other shallow pools. Strikes of "sour zone" oil on two structures in Huron County, in the so-called "thumb area" of the state, will probably account for further drilling in this new year, although both strikes are small.

Drilling to deeper horizons continued in various spots in the state during the past year, but nothing too encouraging has been encountered aside from small basal Salina-Niagaran gas wells in Muskegon County. But with shallow oil wells popping up at least occassionally as wildcats are drilled with deeper zones for their objectives, continuation of the deeper exploration program by the majors and larger independents can be expected.

Richfield oil development was successful in several Michigan pools and additional drilling is expected in these areas in the next 12 months. The most prolific Richfield pools which were under development in 1953 were North Hamilton and Cranberry Lake fields, Clare County. The Richfield oil development in West Branch pool, Ogemaw County, did not measure up to hoped-for standards, but as long as crude oil maintains a price at or near the $3 level, continued Richfield drilling is expected.

The Franklin Township, south extension, area of Headquarters pool, where primary development has been to the sour zone, but with an occasional well completed in the Richfield, will provide the setting for considerable new drilling in the next several months.

It is hard to make a safe statement about what to expect in Michigan in 1954. Last year it looked as if 1953 would surpass 1952 in drilling, but it didn't. If last year appears good, 1954 looms excellent.

Without the benefit of a big strike and development program since Pentwater field was opened in 1948, Michigan has continued to hold its own and drilling rigs, both cable-tool and rotaries, have been busy most all of the year. Contractors report good returns during the past year. With just a few breaks, completions in Michigan during 1954 should approach 900.

PENNSYLVANIA

Deep Drilling at New High With 12 Rotaries Operating

By Carl Roberts

DEEP-DRILLING activity reached what is probably an all-time high in Pennsylvania in 1953.

Rotary drilling became increasingly

MOVING DRILLING MUD--*FAST!*

JUST FOR THE record, this moving job during a changeover was timed, and here are the results: Exactly 8 minutes, 33 seconds after the driver yanked up on the emergency brake, 45 bbls., of 12 lb. mud was snugly inside the Thompson Unitized Vacuum Tank!

TO THE NEXT HOLE

From there to the next hole was discounted as driving time. Starting the stop watch again when the driver had backed up to the shaker pit, the one man laid hose, opened the valve and had the tank empty in 4 minutes, 10 seconds.

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This Thompson UVT moved 45 bbls. of 12 lb. mud from one drillsite to the other (not counting driving time) in 12 minutes, 43 seconds! If you have a mud-moving problem, check Unitized Vacuum Tanks; 20-100 bbls. capacity; truck, trailer, semi-trailer or skid mounted.

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popular and the year's end found 12 rotaries operating in the state. As in the past most of the drilling had the Oriskany sandstone as its objective.

With the completing of the development of Driftwood field the development activity shifted to Benezette field in Elk County. This field currently covers an area of about 40 sq. miles and its productive limits have been defined only on the northwest where salt water was encountered.

Deep drilling area of Pennsylvania has second year.

Three dry holes were completed on the Chestnut Ridge anticline in Pine Township, Clearfied County. (C, D and E on map.)

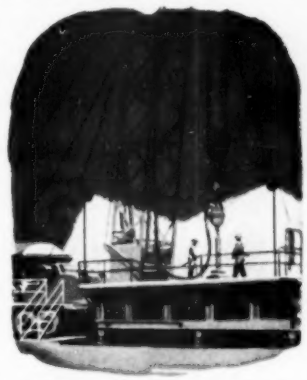
In Bell Township, Clearfield County, an apparent Oriskany discovery well was completed by Deemer on his 2 Alice Irwin location. (F on map.) Further testing of the Laurel Hill anticline in Centre County resulted in the completion of two dry holes. (A and B on map.)

OHIO

Sand Fracturing Boosts Initial Well Productions

THE outstanding development in this state during the year was the large increase in drilling rigs in the Corning grade oil areas, due principally to the adoption of sand fracturing and the resulting increase in initial well productions. Most other areas of the state saw some reduction in drilling activity with the Pennsylvania Grade fields at nearly a standstill as the year ended.

Although total wildcats for the year decreased in number, several finds may prove to be of some importance. A producer south of Hanover in Licking County, and a gasser west of the town both look encouraging. Two gassers in Lake County look like pool openers: one near Painesville is apparently reef production, while the one at Mentor is in the deeper Silurian.



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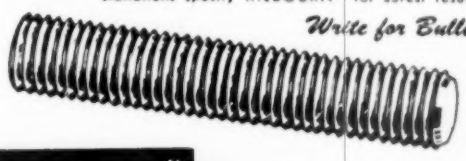

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Ten-Year Record of Footage and Number Of Wells Completed in United States

Total Footage Drilled in United States by Years

(Thousands of feet)

	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953
Arkansas	1,190	828	728	1,409	1,270	1,283	1,342	1,522	1,589	2,111
California	7,527	8,671	7,509	8,764	10,579	10,443	7,966	9,566	10,313	11,355
Colorado	207	352	1,063	1,151	1,228	359	409	1,425	2,580	3,830
Illinois	4,958	4,565	5,925	5,251	6,386	6,362	6,311	6,044	5,312	5,425
Indiana	581	500	1,071	1,206	2,023	2,357	2,642	2,455	2,255	2,102
Kansas	6,194	5,877	6,556	8,690	10,634	10,715	12,744	15,035	15,520	16,217
Kentucky	1,863	1,275	1,175	1,194	1,515	1,853	2,076	2,412	2,568	2,355
Louisiana	5,723	7,774	8,464	8,709	10,934	12,477	14,554	14,189	15,662	19,125
Northern	1,408	2,117	3,175	2,912	4,128	4,453	4,626	4,741	4,815	4,530
Southern	4,315	5,657	5,289	5,797	6,806	8,024	9,928	9,448	10,847	14,595
Michigan	1,620	1,963	1,749	1,935	1,983	2,209	2,118	1,860	1,808	1,603
Mississippi	776	2,403	1,971	4,131	3,312	2,388	2,258	2,539	2,441	2,750
Montana	946	754	661	630	819	650	621	640	1,257	1,933
New Mexico	1,322	1,508	1,624	2,512	2,602	2,419	2,747	3,777	5,833	8,017
N. Y., Pa., and W. Va.	10,038	10,225	9,985	9,702	9,293	5,835	5,381	5,800	6,512	5,662
North Dakota	0					24	27	65	1,002	1,962
Ohio	2,730	2,689	3,402	3,913	3,498	2,286	2,172	2,057	2,295	2,274
Oklahoma	7,172	10,048	9,771	12,151	15,515	15,339	19,865	20,542	21,621	26,122
Texas	26,621	32,495	34,352	41,029	52,746	57,462	71,975	76,777	82,451	78,645
N. Central (7-B & 9)	4,395	5,864	7,065	8,544	11,312	12,831	14,513	16,017	18,688	21,958
West (7-C & 8)	7,572	8,497	8,815	10,809	15,428	16,398	26,543	28,233	29,389	20,318
Panhandle (10)	984	1,686	943	1,593	2,053	3,015	2,804	2,307	2,123	2,555
Eastern (5 & 6)	1,867	2,504	3,792	3,070	3,383	4,992	4,928	5,603	4,455	4,209
Gulf Coast (2 & 3)	9,491	11,690	11,599	9,559	11,995	11,880	13,706	14,328	16,968	16,361
Southwest (1 & 4)	2,312	2,254	2,138	7,454	8,575	8,346	9,481	10,289	10,828	13,244
South Dakota	0		16	8	4	11	30	3	48	103
Wyoming	907	967	716	1,203	2,501	2,803	2,994	3,789	3,529	4,337
Miscellaneous	371	346	318	473	550	728	1,056	1,834	2,594	2,911
Total United States	80,746	93,240	97,056	114,061	137,392	138,003	159,288	172,331	187,190	198,839

Total Completions in United States by Years

	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953
Alabama	34	37	16	29	21	19	43	50	72	103
Arkansas	215	185	183	329	301	322	407	429	427	573
California	2,034	2,150	1,790	2,053	2,876	2,512	1,829	2,361	2,433	2,578
Colorado	33	60	167	209	207	82	99	289	486	734
Florida	13	20	28	35	26	24	13	2	10	30
Illinois	1,949	1,749	2,343	2,033	2,438	2,711	2,823	2,424	2,149	2,165
Indiana	303	305	582	681	1,082	1,279	1,534	1,369	1,277	1,280
Kansas	1,837	1,796	2,027	2,694	3,284	3,387	4,010	4,501	4,571	4,783
Kentucky	933	737	714	660	908	1,047	1,150	1,309	1,300	1,164
Louisiana	803	1,108	1,384	1,626	2,325	2,371	2,453	2,240	2,385	2,828
Michigan	655	770	788	909	895	995	897	746	707	623
Mississippi	156	362	260	491	428	334	313	375	348	397
Missouri	0	0	0	0	0	0	27	18	18	10
Montana	387	312	313	309	345	279	270	262	345	451
Nebraska	33	32	18	7	62	49	171	241	291	320
New Mexico	414	424	411	562	606	501	607	773	1,053	1,418
New York		1,423	1,544	1,531	1,344	882	657	627	767	696
North Dakota	0	0	0	0	0	0	1	13	122	270
Ohio	1,023	1,014	1,275	1,377	1,393	1,084	1,027	971	1,052	1,080
Oklahoma	1,890	2,521	3,050	3,846	4,293	4,352	5,459	5,626	5,781	7,593
Pennsylvania	6,543	3,642	3,584	3,238	3,159	1,920	1,581	1,738	1,884	1,507
South Dakota	0	0	9	3	0	0	14	0	14	20
Texas	5,729	7,195	7,804	9,301	12,251	13,665	16,585	16,655	16,845	17,019
Utah	4	0	4	4	18	49	17	39	79	70
West Virginia		806	755	882	846	518	652	622	606	618
Wyoming	205	227	168	267	584	587	615	745	700	917
Miscellaneous	69	4	11	46	86	69	25	91	99	32
Total	25,262	26,879	29,228	33,122	39,778	39,038	43,279	44,516	45,821	49,279

Exploratory and Development Drilling—1953

SOUTHWEST TEXAS
(District 1)
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Atascosa	8	0	61	69	209,746
Bandera	0	0	3	3	16,197
Bastrop	0	0	20	20	49,322
Bell	0	0	11	11	14,268
Bexar	2	0	10	12	20,920
Caldwell	1	0	12	13	38,636
Dimmit	1	0	12	13	63,938
Edwards	0	0	5	5	37,214
Frio	5	2	60	67	259,003
Gonzales	2	0	26	28	85,342
Guadalupe	0	0	17	17	37,001
Hays	0	0	3	3	2,652
Kendall	0	0	1	1	6,250
Kimble	0	0	2	2	4,410
Kinney	0	0	1	1	4,373
LaSalle	0	0	8	8	40,051
Mason	0	0	1	1	1,095
McMullen	1	4	27	32	183,117
Medina	1	0	15	16	21,885
Menard	0	0	1	1	3,535
Milam	1	1	13	15	41,962
Real	0	0	2	2	16,368
Travis	0	0	20	20	21,627
Val Verde	0	0	6	6	18,599
Williamson	1	0	8	9	11,786
Wilson	6	0	38	44	168,933
Zavala	0	3	10	13	66,729
Total	*29	10	393	432	1,444,959

*Includes 2 gas-condensate wells. Two old wells drilled deeper not included.

SOUTHWEST TEXAS
(District 1)
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Atascosa	69	0	17	86	203,142
Bastrop	2	0	3	5	11,590
Bexar	22	0	7	29	42,092
Caldwell	31	1	3	35	78,199
Dimmit	2	0	2	4	13,966
Edwards	0	0	1	1	1,100
Frio	181	1	9	191	715,461
Gonzales	4	0	1	5	10,564
Guadalupe	46	0	5	51	133,733
LaSalle	0	0	1	1	2,313
McMullen	26	3	5	34	130,410
Medina	5	0	10	15	17,671
Milam	4	0	4	8	7,078
Travis	1	0	2	3	2,927
Wilson	6	0	10	16	70,344
Zavala	0	0	1	1	3,450
Total	*399	5	81	485	1,444,040

*Includes 1 gas-condensate well.

TEXAS GULF COAST
(District 2)
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Bee	2	1	44	47	239,394
Calhoun	5	7	15	27	224,316
DeWitt	3	1	30	34	263,007
Goliad	6	3	40	49	266,992
Jackson	3	9	42	54	353,620
Karnes	2	1	25	28	156,756
Lavaca	0	0	6	6	49,427
Live Oak	9	3	43	55	263,781
Refugio	5	0	20	25	177,977
Victoria	6	1	37	44	245,715
Total	*41	26	302	369	2,240,985

*Includes 15 gas-condensate wells.

TEXAS GULF COAST
(District 2)
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Bee	22	13	22	57	296,766
Calhoun	11	7	5	23	193,379
DeWitt	40	5	16	61	465,940
Goliad	34	12	18	64	344,574
Jackson	42	14	12	68	418,588
Karnes	7	1	5	13	72,500
Lavaca	5	7	1	13	95,980
Live Oak	36	12	11	59	292,456
Refugio	39	24	7	70	384,443
Victoria	46	19	15	80	520,120
Total	*282	114	112	580	3,084,746

*Includes 28 gas-condensate wells. One old well drilled deeper not included.

TEXAS GULF COAST
(District 3)
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Austin	1	0	5	6	37,845
Brazoria	14	7	39	60	519,492
Burleson	0	0	3	3	9,931
Chambers	0	0	12	12	104,540
Colorado	11	4	6	21	173,718
Fayette	3	0	24	27	91,510
Fort Bend	1	0	28	29	217,222
Galveston	8	0	19	27	279,047
Grimes	0	2	6	8	76,973
Hardin	4	0	12	16	122,469
Harris	12	8	49	69	599,188
Jasper	4	2	4	10	80,653
Jefferson	5	3	24	32	264,950
Lee	1	0	3	4	19,557
Liberty	7	4	32	43	354,772
Madison	0	0	1	1	10,857
Matagorda	3	2	26	31	292,972
Montgomery	2	2	14	18	141,959
Newton	1	0	11	12	94,851
Orange	4	2	14	20	173,310
Polk	2	0	8	10	64,918
San Jacinto	0	2	6	8	75,768
Trinity	0	0	2	2	5,868
Tyler	1	0	4	5	39,775
Walker	1	0	0	1	5,335
Waller	0	0	1	1	6,264
Washington	0	0	4	4	38,122
Wharton	4	9	26	39	265,703
Total	*89	47	393	519	4,106,862

*Includes 10 gas-condensate wells.

TEXAS GULF COAST
(District 3)
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Austin	29	1	3	33	199,656
Brazoria	61	7	38	106	624,592
Chambers	52	7	15	74	544,932
Colorado	6	11	9	26	193,787
Fayette	14	0	4	18	38,783
Fort Bend	35	1	35	61	270,939
Galveston	20	2	8	30	250,930
Grimes	0	0	1	1	7,818
Hardin	62	4	26	92	531,392
Harris	102	6	30	138	811,466
Houston	5	0	0	5	45,911
Jasper	7	0	0	7	54,558
Jefferson	95	9	15	119	774,494
Liberty	83	6	28	117	770,495
Madison	2	1	1	4	39,345
Matagorda	17	11	20	48	318,975
Montgomery	19	1	4	24	156,060
Newton	2	0	8	10	97,480
Orange	36	6	7	49	338,903
Polk	10	0	3	13	79,420
San Jacinto	1	3	3	7	75,053
Tyler	12	0	2	14	96,297
Walker	0	0	1	1	7,060
Waller	6	0	4	10	70,127
Wharton	45	28	44	117	536,477
Total	*721	104	†299	1,124	6,927,950

*Includes 35 gas-condensate wells. †Includes 2 service wells. Five old wells drilled deeper not included.

SOUTHWEST TEXAS
(District 4)
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Aransas	8	0	19	27	228,403
Brooks	1	0	12	13	97,743
Cameron	0	1	3	4	39,915
Duval	5	11	64	80	335,760
Hidalgo	9	9	25	43	307,423
Jim Hogg	3	0	45	48	200,191
Jim Wells	11	5	34	50	287,377
Kenedy	1	3	5	9	82,778
Kleberg	1	1	5	7	71,572
Nueces	15	4	57	76	551,697
San Patricio	16	7	54	77	583,262
Starr	14	2	36	52	216,591
Webb	4	1	61	66	229,094
Willacy	1	3	10	14	130,318
Zapata	2	2	33	37	126,296
Total	*91	49	463	603	3,518,420

*Includes 20 gas-condensate wells.

SOUTHWEST TEXAS
(District 4)
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Aransas	86	10	24	120	791,620
Brooks	25	4	4	33	219,582
Duval	81	16	27	124	484,423
Hidalgo	17	25	21	63	512,551
Jim Hogg	9	1	7	17	55,994
Jim Wells	53	14	21	88	509,340
Kenedy	2	11	6	19	143,197
Kleberg	49	3	4	56	406,145
Nueces	157	26	28	211	1,475,669
San Patricio	119	44	38	201	1,232,315
Starr	105	18	30	153	739,332
Webb	43	0	6	49	107,347
Willacy	4	2	3	9	82,627
Zapata	36	1	5	42	77,481
Total	*786	175	†224	1,185	6,837,623

*Includes 35 gas-condensate wells. †Includes 3 service wells. Three old wells drilled deeper not included.

EAST TEXAS
(Districts 5 and 6)
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Anderson	3	0	15	18	70,823
Angelina	0	0	1	1	6,015
Bowie	0	0	9	9	38,845
Camp	2	0	3	5	29,931
Cass	0	0	2	2	11,517
Cherokee	2	0	24	26	141,405
Delta	0	0	1	1	6,250
Ellis	0	0	3	3	8,801
Falls	0	0	3	3	5,832
Fannin	0	0	2	2	9,867
Franklin	1	0	1	2	14,736
Freestone	2	0	9	11	54,087
Harrison	4	2	14	20	135,404
Henderson	2	0	11	13	66,010
Hill	0	0	6	6	6,753
Hopkins	0	0	5	5	26,861
Houston	0	0	12	12	69,081
Hunt	0	0	15	15	51,433
Johnson	0	0	1	1	9,646
Kaufman	2	0	12	14	63,033
Lamar	0	0	2	2	3,615
Leon	0	0	6	6	42,021
Limestone	1	1	5	7	36,467
Madison	0	0	1	1	10,860
McLennan	0	0	1	1	1,603
Marion	1	0	3	4	21,042
Morris	0	0	6	6	30,420
Nacogdoches	0	0	1	1	7,437
Navarro	1	0	18	19	54,344
Panola	0	1	3	4	22,572
Rains	0	0	2	2	11,550
Red River	1	0	5	6	20,810
Robertson	0	1	2	3	20,261

Review-Forecast Drilling by Counties

	Oil	Gas	Dry	Total	Footage
Rusk	1	0	5	6	40,870
Saline	0	0	5	5	38,101
St. Augustine	0	0	2	2	19,033
Shelby	1	0	6	7	36,593
Smith	3	0	7	10	57,283
Titus	0	0	3	3	13,924
Upshur	1	0	2	3	21,241
Van Zandt	0	0	14	14	65,374
Wood	1	0	18	19	107,832
Total	29	5	266	300	1,509,583

EAST TEXAS
(Districts 5 and 6)
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Anderson	7	0	4	11	68,128
Bowie	0	0	1	1	4,423
Cass	1	0	1	2	15,030
Cherokee	3	0	15	18	82,409
Ellis	2	0	1	3	2,100
East Texas Field	37	0	3	40	143,682
Falls	1	0	1	2	2,140
Franklin	0	0	1	1	4,323
Freestone	2	5	14	21	101,217
Gregg	9	12	2	23	155,791
Harrison	26	20	13	59	377,503
Henderson	1	1	5	7	52,091
Hill	1	0	0	1	623
Hopkins	2	0	0	2	15,674
Houston	6	2	0	8	60,426
Hunt	1	0	2	3	9,495
Kaufman	17	0	9	26	105,796
Leon	1	3	3	7	45,666
Limestone	2	0	2	4	13,315
McLennan	2	0	0	2	942
Marion	22	2	1	25	160,656
Nacogdoches	2	9	12	23	194,196
Navarro	39	0	9	48	189,129
Panola	11	33	8	52	327,450
Red River	1	0	2	3	15,232
Robertson	0	0	1	1	3,255
Rusk	5	3	5	13	67,452
Shelby	0	4	1	5	26,582
Smith	12	0	2	14	98,088
Titus	2	0	0	2	8,898
Van Zandt	17	0	2	19	38,522
Wood	39	0	23	62	308,734
Total	271	94	143	508	2,698,968

WEST CENTRAL TEXAS
(District 7-B)
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Brown	23	0	38	61	92,709
Callahan	15	1	88	104	283,680
Coleman	36	0	177	213	566,179
Comanche	0	0	6	6	15,491
Eastland	6	6	31	43	111,573
Erath	0	0	1	1	4,202
Fisher	12	0	48	60	343,105
Hamilton	0	0	1	1	4,080
Haskell	16	0	63	79	377,947
Jones	28	1	123	152	514,083
Nolan	9	0	27	36	219,363
Palo Pinto	3	1	18	22	47,649
Parker	2	0	6	8	36,613
San Saba	0	0	2	2	1,711
Shackelford	17	0	57	74	164,139
Stephens	8	2	23	33	116,109
Stonewall	9	0	37	46	274,534
Taylor	15	0	55	70	311,214
Throckmorton	14	0	37	51	236,531
Total	213	11	838	1,062	3,720,912

Oil wells include 1 distillate.

WEST CENTRAL TEXAS
(District 7-B)
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Brown	124	0	21	145	192,257
Callahan	109	3	33	145	338,771
Coleman	181	2	64	247	725,683
Comanche	4	0	1	5	14,562
Eastland	22	2	13	37	94,853
Fisher	93	0	12	105	515,934
Haskell	78	0	51	129	557,075
Jones	137	0	75	212	681,226
Nolan	114	2	15	131	760,507
Palo Pinto	22	1	12	35	57,294
Parker	1	0	2	3	14,037
Shackelford	70	0	41	111	240,401
Stephens	63	2	26	91	225,757
Stonewall	185	0	21	206	1,100,611
Taylor	53	0	31	84	331,212
Throckmorton	31	0	11	42	154,410
Total	1,287	12	429	1,728	6,004,590

WEST TEXAS
(Districts 8 and 7-C)
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Andrews	27	1	22	50	490,541
Borden	3	0	19	22	177,982
Brewster	0	0	2	2	488
Cochran	3	0	7	10	69,306
Coke	6	0	27	33	205,360
Concho	2	0	6	8	22,534
Cottle	0	0	1	1	7,051
Crane	3	0	4	7	54,673
Crockett	13	3	39	55	248,141
Crosby	0	0	6	6	41,696
Culberson	1	1	8	10	37,890
Dawson	6	0	15	21	181,872
Dickens	1	0	4	5	33,592
Ector	5	0	12	17	154,073
El Paso	0	0	1	1	1,550
Floyd	0	0	1	1	10,358
Gaines	5	1	19	25	203,516
Garza	2	0	18	20	84,811
Glasscock	0	0	4	4	35,409
Hale	0	0	2	2	12,872
Hockley	3	0	13	16	159,119
Howard	8	0	21	29	195,281
Hudspeth	0	0	1	1	5,420
Irion	0	0	5	5	16,349
Jeff Davis	0	0	1	1	9,563
Kent	2	0	14	16	86,371
Kimble	0	0	4	4	8,565
King	1	0	12	13	82,014
Lamb	1	0	1	2	18,842
Loving	1	0	12	13	61,558
Lubbock	0	0	3	3	25,527
Lynn	4	0	3	7	47,205
McCulloch	3	0	4	7	11,140

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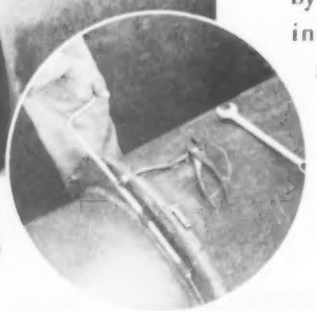

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Review-Forecast Drilling by Counties

	Oil	Gas	Dry	Total	Footage
Martin	1	0	6	7	48,479
Menard	0	0	5	5	7,454
Midland	3	0	10	13	99,645
Mitchell	4	0	14	18	86,749
Motley	0	0	3	3	29,202
Pecos	10	3	32	45	221,402
Presido	0	0	2	2	22,129
Reagan	3	0	10	13	112,388
Reeves	1	0	12	13	61,859
Runnels	16	0	70	86	367,657
Schleicher	10	1	40	51	295,093
Scurry	1	0	12	13	72,502
Sterling	2	0	11	13	30,635
Sutton	1	0	32	33	188,512
Terrell	0	1	3	4	19,538
Terry	2	0	9	11	63,421
Tom Green	6	0	55	61	227,184
Upton	9	0	20	29	217,041
Ward	5	2	5	12	64,634
Winkler	1	0	9	10	74,430
Yoakum	5	0	12	17	143,108
Total	180	13	683	876	5,253,731

Oil wells include 5 distillate.

WEST TEXAS
(Districts 8 and 7-C)
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Andrews	178	1	18	197	1,302,014
Borden	17	0	6	23	170,370
Cochran	156	1	5	162	813,363
Coke	166	0	10	176	997,091
Concho	0	0	1	1	2,292
Crane	62	0	6	68	312,857
Crockett	64	2	17	83	312,188
Culberson	0	0	3	3	4,228
Dawson	24	0	2	26	163,189
Dickens	2	0	1	3	13,407
Ector	114	0	10	124	846,943
Gaines	134	1	15	150	1,015,752
Garza	36	0	10	46	172,805
Glasscock	74	0	0	74	466,075
Hockley	37	0	4	41	215,310
Howard	91	0	14	105	432,497
Irion	3	0	3	6	18,536
Kent	26	0	5	31	152,056
Kimble	0	0	1	1	1,400
King	6	0	2	8	41,293
Loving	44	0	8	52	210,037
Lubbock	4	0	0	4	24,582
Lynn	0	0	1	1	9,322
Martin	7	0	1	8	77,983
McCulloch	0	0	1	1	1,830
Midland	98	0	5	103	929,832
Mitchell	28	0	7	35	158,280
Pecos	146	1	49	196	517,022
Reagan	98	0	4	102	755,667
Reeves	9	0	2	11	38,794
Runnels	271	0	46	317	1,272,358
Schleicher	56	3	12	71	380,251
Scurry	109	0	10	119	605,786
Sterling	19	0	4	23	65,330
Sutton	0	0	3	3	11,529
Terrell	0	2	1	3	17,233
Terry	73	0	6	79	558,947
Tom Green	19	0	8	27	46,938
Upton	127	0	24	151	846,994
Ward	61	0	20	81	238,750
Winkler	45	5	9	59	284,828
Yoakum	80	1	4	85	548,743
Total	2,484	17	358	2,859	15,064,702

Oil wells include 23 distillate.

NORTH CENTRAL TEXAS
(District 9)
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Archer	34	0	187	221	561,768
Baylor	2	0	31	33	117,953
Clay	14	0	56	70	320,949
Cooke	9	0	46	55	191,849
Denton	1	0	8	9	25,850
Foard	0	0	5	5	30,951
Grayson	23	0	42	65	420,793
Jack	52	4	86	142	544,983
Knox	5	0	28	33	186,424
Montague	18	0	81	99	573,574
Wichita	13	0	41	54	129,233
Wilbarger	12	0	58	70	173,795
Wise	2	1	7	10	54,447
Young	45	3	144	192	570,825
Total	230	8	820	1,058	3,903,394

Oil wells include 4 distillate.

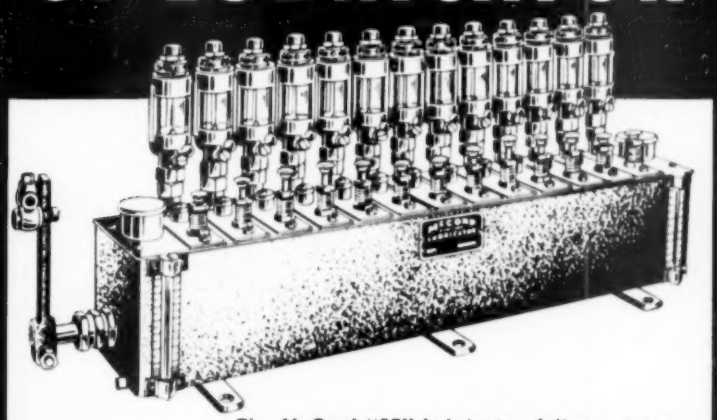
NORTH CENTRAL TEXAS
(District 9)
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Archer	259	0	160	419	792,512
Baylor	23	0	2	25	108,784
Clay	142	0	49	191	761,699
Cooke	98	0	37	135	421,454
Denton	14	0	8	22	38,127
Foard	4	0	0	4	8,228
Grayson	175	0	20	195	1,150,177
Jack	241	10	106	357	1,261,027
Knox	16	0	13	29	133,339
Montague	169	0	46	215	1,217,666
Wichita	310	0	127	437	916,640
Wilbarger	163	1	70	234	499,624
Wise	12	6	5	23	122,540
Young	204	3	124	331	896,812
Total	1,830	20	767	2,617	8,328,629

TEXAS PANHANDLE
(District 10)
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Carson	74	20	8	102	314,247
Collingsworth	0	5	3	8	22,544
Gray	63	69	13	145	418,454
Hale	4	0	2	6	37,673
Hansford	1	12	2	15	55,714
Hartley	1	6	3	10	43,021
Hutchinson	174	33	14	221	676,046
Moore	11	58	2	71	225,375
Ochiltree	0	0	1	1	8,502
Oldham	0	0	1	1	4,115
Potter	0	36	3	39	110,944

McCORD Tubular "Clearsite" Feed
SF LUBRICATOR



The McCord "SF" Lubricator delivers a predetermined quantity of oil under pressure at regular intervals to cylinders or bearings. A new improved tubular clearsight feed, a McCord development, shows delivery and quantity of oil. It may be cleaned without removing from pump. Other McCord advantages are easy removal of pump units, welded steel tanks, wide variety of drives, and a new graduated oil level gauge providing greater visibility. McCord offers you an outstanding lubricator, further improved to provide better service. Deliveries are prompt.

LUBRICATOR DIVISION
McCORD CORPORATION
Detroit 11, Michigan

Review-Forecast Drilling by Counties

	Oil	Gas	Dry	Total	Footage
Roberts	79	5	8	92	422,671
Sherman	0	12	3	15	49,180
Wheeler	8	11	1	20	46,097
Total	416	268	60	744	2,406,758

TEXAS PANHANDLE
(District 10)
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Childress	0	0	2	2	12,457
Collingsworth	0	0	1	1	4,815
Donley	0	0	2	2	8,950
Gray	0	0	1	1	8,048
Hemphill	0	0	1	1	4,106
Hutchinson	0	0	4	4	17,239
Lipscomb	0	0	1	1	4,015
Ochiltree	0	0	1	1	10,568
Parmer	0	0	2	2	10,828
Roberts	2	0	6	8	47,387
Wheeler	0	0	3	3	19,383
Total	2	0	24	26	147,796

Oil wells include 2 distillate.

SOUTHEAST NEW MEXICO
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Chaves	2	0	3	5	31,130
Eddy	48	0	32	80	150,814
Lea	489	37	54	580	4,312,965
Total	539	37	89	665	4,494,909

SOUTHEAST NEW MEXICO
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Chaves	3	0	13	16	99,820
Curry	0	0	1	1	8,180
DeBaca	0	0	2	2	8,442
Eddy	7	1	23	31	137,664
Lea	15	1	52	68	612,767
Lincoln	0	0	2	2	3,460
Otero	0	0	1	1	4,646
Roosevelt	0	0	3	3	20,836
Socorro	0	0	1	1	2,990
Torrance	0	0	1	1	1,201
Total	25	2	99	126	900,006

NORTH LOUISIANA
Wildcat Completions by Parishes

	Oil	Gas	Dry	Total	Footage
Bienville	0	0	7	7	43,419
Bossier	1	1	14	16	73,585
Caddo	0	0	2	2	11,567
Caldwell	0	0	3	3	13,896
Catahoula	0	0	16	16	96,194
Claiborne	3	1	5	9	78,031
Concordia	5	0	34	39	265,520
DeSoto	0	0	10	10	36,772
Franklin	0	0	2	2	12,999
Grant	1	0	8	9	47,278
LaSalle	1	0	7	8	35,448
Lincoln	0	1	0	1	10,073
Madison	0	0	3	3	15,115
Morehouse	0	0	3	3	24,327
Natchitoches	0	0	6	6	28,141
Ouachita	0	1	2	3	17,117
Red River	0	0	4	4	11,180
Richland	0	0	2	2	8,775
Sabine	0	0	8	8	29,438
Tensas	1	0	4	5	41,432
Union	0	0	8	8	69,353
Webster	1	0	5	6	31,867
Winn	0	0	7	7	23,107
Total	13	4	160	177	1,025,434

NORTH LOUISIANA
Development Completions by Parishes

	Oil	Gas	Dry	Total	Footage
Bienville	2	5	6	13	80,885
Bossier	26	15	16	57	207,995
Caddo	519	14	75	608	1,148,040
Catahoula	2	0	7	9	55,409
Claiborne	21	3	18	42	310,430
Concordia	32	0	25	57	364,620
DeSoto	18	22	43	83	273,511
Franklin	0	1	8	9	35,409
Grant	0	0	6	6	25,356
LaSalle	13	0	20	33	103,612
Lincoln	5	10	10	25	206,198
Madison	0	0	2	2	7,929
Natchitoches	0	0	6	6	16,115
Ouachita	0	2	2	4	19,862
Red River	5	0	2	7	8,682
Richland	1	1	15	17	58,212
Sabine	2	0	5	7	17,273
Tensas	1	0	1	2	19,766
Union	0	40	3	43	102,918
Webster	56	2	20	78	431,242
Winn	6	0	4	10	11,377
Total	*709	115	294	1,118	3,504,841

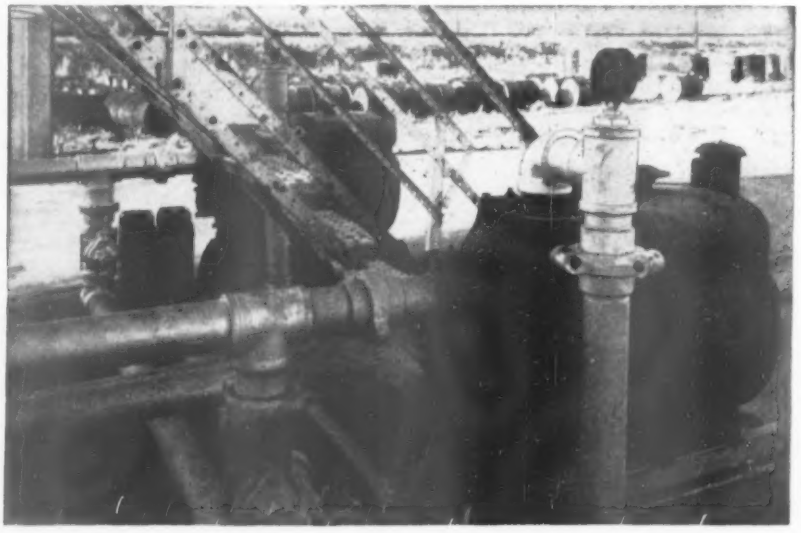
*Including 2 condensate wells.

SOUTH LOUISIANA
Wildcat Completions by Parishes

	Oil	Gas	Dry	Total	Footage
Acadia	5	0	7	12	127,725
Allen	2	0	3	5	49,120
Ascension	1	0	3	4	43,921
Assumption	1	0	5	6	76,276
Avoyelles	0	0	5	5	38,022
Beauregard	4	0	9	13	113,560
Calcasieu	6	2	14	22	204,151
Cameron	7	3	12	22	235,527
E. Baton Rouge	1	0	3	4	41,916
Evangeline	0	0	6	6	61,618
Iberia	3	0	5	8	98,420
Iberville	2	0	4	6	64,910
Jefferson	0	0	6	6	74,367
Jefferson Davis	3	0	9	12	130,336
Lafourche	12	0	7	19	231,177
Livingston	0	0	1	1	9,518
Orleans	1	0	4	5	55,511
Plaquemines	15	6	44	65	551,465
Pointe Coupee	2	0	2	4	41,357
Rapides	3	0	2	5	46,880
St. Bernard	0	1	8	9	97,590
St. Charles	8	0	1	9	103,837
St. Helena	0	0	1	1	10,002
St. John the Baptist	0	0	3	3	33,894
St. James	0	0	2	2	21,828
St. Landry	7	0	11	18	194,418
St. Martin	6	1	1	8	89,883
St. Mary	8	2	10	20	233,872

Pumps

. . . . FOR THE OIL INDUSTRY



Exclusive twin priming advantages give C.M.C. Dual Prime Pumps longer life, minimum maintenance and outstanding operating performance.

They are simple, rugged, fool-proof—and every pump is tested under most severe conditions.

Automatic priming speed on lifts up to 25′ is unmatched. Sizes 1½″ to 10″—3,000 to 240,000 G.P.H.

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Two C.M.C. Dual Prime Model 420 Pumps loading lub-oil for Mid-Continent Petroleum Corporation at Odessa, Texas

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WATERLOO, IOWA

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CRUCIBLE REXALLOY balls and seats

for increased pump efficiency — longer life

Barrel pumps equipped with Crucible REXALLOY Balls and Seats last longer, give trouble-free performance between "pulls", under severest operating conditions.

That's because REXALLOY is a nonferrous cobalt-chromium-tungsten cast alloy that has exceptionally high resistance to most forms of wear — abrasion, erosion, friction, corrosion and heat. It's a wise choice for oil well pump ball check valves . . . especially in gassy wells or wells with high sand, acid, alkali or salt water content.

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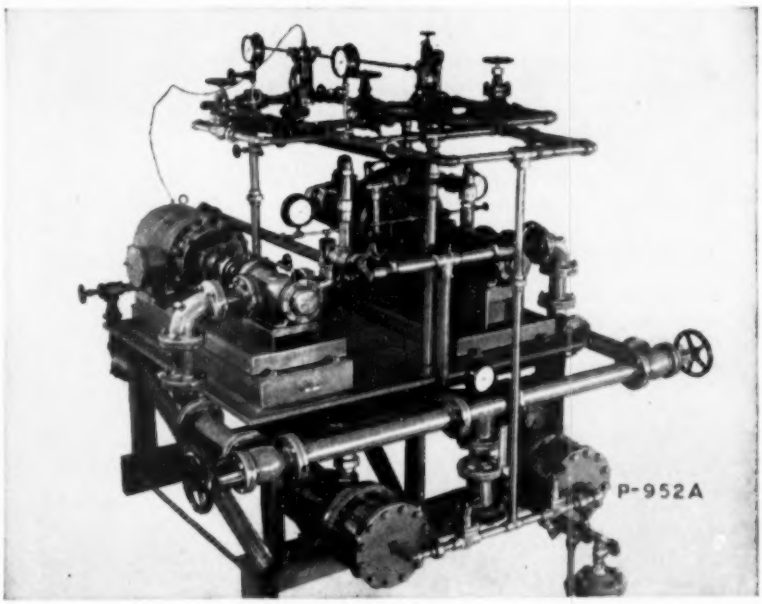
CRUCIBLE STEEL COMPANY OF AMERICA, OLIVER BUILDING, PITTSBURGH, PA.

REX HIGH SPEED • TOOL • RESISTAL STAINLESS • ALLOY • MAX-EL • SPECIAL PURPOSE STEELS

Now! MORE COMPACT THAN EVER . .



P-952A—Steam Turbine and Electric Motor drive gives flexibility in this compact Model P-E52H size No. 25 unit.

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FUEL OIL PUMPING *AND* HEATING UNITS

NATIONAL AIROIL Fuel Oil Pumping and Heating Units are specially designed to prepare, for combustion, all grades of fuel oil including No. 6 or Bunker "C" Oil and residuums. They will draw fuel oil from above ground or underground tanks, preheat it to proper constant temperature and deliver it to Oil Burners at an even pressure, best suited for the burners. Our Fuel Oil Pumping and Heating Units are the result of years of experience. They come completely equipped ready for steam, exhaust, condensate, oil suction, oil return, and electrical connections. All valves, regulators, etc., are readily accessible. The piping arrangement is easily understood. These compact, space-saving units are available in a range of sizes and models in both Medium and High Pressure types. For complete details, write for our Bulletin 40 — very interesting and informative.

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frequency synthesis

analysis simplified...

The Sine Wave Generator is designed as a convenient tool to determine transfer functions of components in automatic control systems and to define the physical properties of existing plants to which control systems are to be added. Data is acquired by the frequency synthesis method in which sinusoidal forcing functions are applied to the system and measurements taken of amplitude and phase shift of the output response. For further information on this or other special purpose devices, or assistance in solving your particular computing-controlling problems, consult LIBRASCOPE.

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THE SINE WAVE GENERATOR

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Engineers, physicists and mathematicians in search of interesting assignments, rapid advancement, and job security are requested to write Dick Hastings, Personnel Director.

Review-Forecast Drilling by Counties

	Oil	Gas	Dry	Total	Footage
Terrebonne	12	1	7	20	259,113
Vermilion	2	1	8	11	128,231
Vernon	0	0	1	1	11,468
Washington	0	0	2	2	21,291
W. Baton Rouge	0	0	2	2	21,011
Total	*111	17	208	336	3,512,215

*Includes 38 gas-condensate wells.

SOUTH LOUISIANA

Development Completions by Parishes

	Oil	Gas	Dry	Total	Footage
Acadia	32	14	20	66	591,172
Allen	5	0	0	5	46,354
Ascension	2	0	5	7	54,788
Assumption	5	2	6	13	142,720
Beauregard	6	0	5	11	91,623
Calcasieu	55	5	17	77	519,549
Cameron	31	8	17	56	529,923
E. Baton Rouge	1	0	2	3	32,482
Evangeline	6	0	4	10	78,607
Iberia	37	1	14	52	546,379
Iberville	22	0	11	33	296,901
Jefferson	28	0	8	36	393,515
Jefferson Davis	16	8	9	33	313,254
Lafayette	2	0	2	4	37,768
Lafourche	108	5	45	158	1,349,111
Livingston	0	0	2	2	18,936
Orleans	0	0	1	1	10,290
Plaquemines	174	9	70	253	2,221,367
Pointe Coupee	32	2	6	40	387,825
Rapides	2	0	2	4	38,546
St. Charles	12	0	13	25	232,462
St. James	6	2	3	11	83,134
St. John the Baptist	0	0	1	1	9,698
St. Landry	14	7	12	33	259,453
St. Martin	26	3	8	37	342,688
St. Mary	28	4	22	55	544,562
Terrebonne	93	10	30	133	1,364,807
Vermilion	16	6	6	28	447,749
Washington	1	0	0	1	9,030
W. Baton Rouge	5	0	4	9	87,697
Total	*766	86	†345	1,197	11,082,390

*Includes 77 gas-condensate wells. †Includes 1 service well. Six old wells drilled deeper not included.

ARKANSAS

Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Arkansas	0	0	3	3	12,881
Ashley	0	0	2	2	7,657
Bradley	0	0	1	1	3,740
Calhoun	0	0	1	1	3,001
Clark	0	0	1	1	599
Cleveland	0	0	1	1	4,325
Columbia	3	0	8	11	63,941
Cross	0	0	4	4	10,551
Dallas	0	0	3	3	7,010
Drew	0	0	4	4	12,887
Hempstead	0	0	4	4	14,292
Howard	0	0	1	1	302
Jackson	0	0	2	2	4,222
Lafayette	2	0	8	10	50,470
Lonoke	0	0	2	2	5,180
Miller	2	0	9	11	57,760
Monroe	0	0	6	6	18,343
Nevada	0	0	3	3	7,797
Ouachita	0	0	13	13	35,616
Phillips	0	0	2	2	7,270
Poinsett	0	0	2	2	4,089
Prairie	0	0	3	3	6,320
Saline	0	0	1	1	1,029
Union	5	0	16	21	119,638
White	0	0	5	5	3,777
Woodruff	0	0	23	23	30,063
Total	12	0	128	140	492,760

ARKANSAS

Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Calhoun	2	0	2	4	13,081
Columbia	24	0	18	42	212,524
Lafayette	17	0	19	36	153,215
Miller	33	0	35	68	314,789
Nevada	33	0	12	45	109,074

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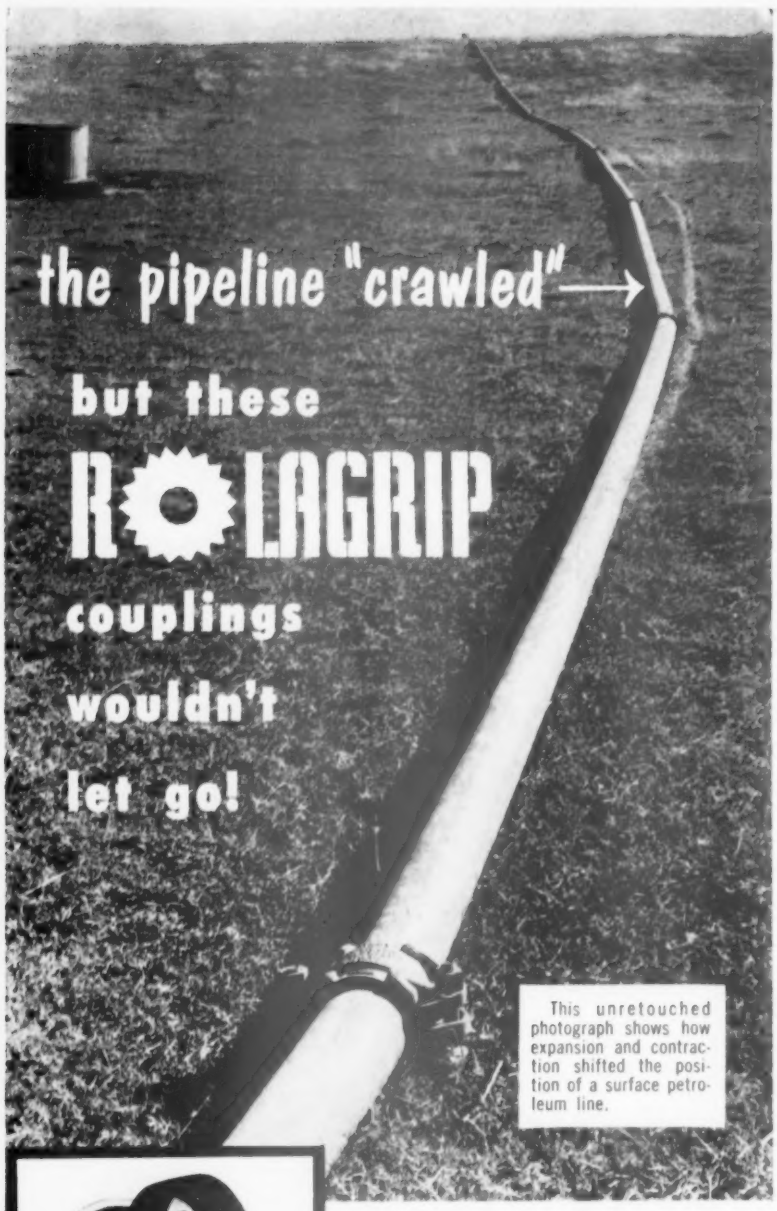
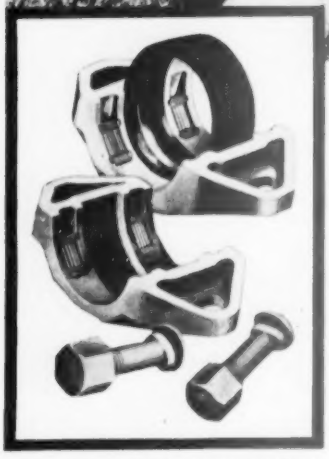


This unretouched photograph shows how expansion and contraction shifted the position of a surface petroleum line.



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Review-Forecast
Drilling by Counties

	Oil	Gas	Dry	Total	Footage
Ouachita	30	1	23	54	166,115
Union	122	0	62	184	649,438
Total	*261	1	171	433	1,618,236

*Includes 1 condensate well.

KANSAS
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Barber	1	4	15	20	97,276
Barton	9	2	42	53	186,671
Butler	1	0	37	38	107,602
Chase	0	0	2	2	5,020
Clark	0	3	1	4	22,842
Clay	0	0	1	1	2,858
Coffey	2	0	3	5	8,089
Comanche	0	1	3	4	22,811
Cowley	6	1	39	46	146,175
Decatur	1	0	5	6	25,067
Dickinson	0	0	5	5	12,365
Edwards	1	0	5	6	28,121
Elk	0	0	1	1	2,870
Ellis	12	0	63	75	278,705
Ellsworth	1	0	14	15	51,111
Finney	2	1	5	8	40,152
Ford	0	1	3	4	21,562
Geary	0	0	1	1	2,953
Gove	0	0	3	3	13,604
Graham	3	0	17	20	79,709
Gray	1	0	3	4	22,564
Greenwood	2	0	14	16	34,594
Hamilton	0	0	2	2	11,133
Harper	0	1	5	6	28,892
Harvey	0	0	7	7	23,987
Hodgeman	1	0	5	6	28,417
Jackson	0	0	1	1	3,244
Jewell	0	0	1	1	4,120
Kearny	0	0	1	1	5,180
Kingman	2	0	17	19	84,684
Kiowa	0	0	3	3	15,292
Lane	0	0	3	3	14,442
Logan	0	0	4	4	19,144
Lyon	0	0	9	9	23,413
Marion	1	1	20	22	62,367
Marshall	0	0	2	2	2,184
McPherson	3	0	17	20	65,460
Meade	1	3	4	8	48,889
Mitchell	0	0	2	2	7,960
Morris	0	0	2	2	5,036
Morton	0	13	2	15	64,513
Nemaha	0	0	1	1	3,716
Ness	0	0	9	9	40,996
Norton	1	0	18	19	71,143
Osborne	0	0	4	4	15,986
Pawnee	5	3	46	54	219,008
Phillips	0	0	7	7	25,132
Pratt	6	0	25	31	141,538
Rawlins	0	0	2	2	9,503
Reno	0	0	18	18	71,861
Rice	2	0	15	17	58,349
Riley	0	0	2	2	5,500
Rooks	8	0	41	49	177,973
Rush	1	1	21	23	88,345
Russell	0	0	13	13	42,682
Saline	0	0	11	11	36,415
Scott	0	0	2	2	10,034
Sedgwick	1	0	13	14	49,696
Seward	0	2	2	4	24,932
Sheridan	2	0	9	11	48,285
Sherman	0	0	2	2	10,530
Smith	0	0	1	1	4,198
Stafford	14	0	48	62	254,914
Stanton	0	0	1	1	6,434
Sumner	0	0	19	19	77,613
Thomas	1	0	1	2	9,810
Trego	4	0	24	28	117,052
Waubaunsee	0	0	2	2	5,795
Wichita	0	0	3	3	15,149
Woodson	1	0	5	6	9,025
Total	96	37	754	887	3,382,692

KANSAS
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Barber	11	9	13	33	144,611
Barton	218	3	170	391	1,352,855
Butler	175	0	85	260	692,532
Chase	1	0	0	1	2,500
Chautauqua	2	0	0	2	3,131
Clark	1	0	5	6	30,954
Coffey	12	0	6	18	22,496

A NEW MURPHY SAFETY SWITCH FOR SURE FULLY AUTOMATIC ENGINE PROTECTION

model *O-270*

Set lock-out by pushbutton. Engine oil pressure rise releases lock-out and places switch circuit in operation automatically.

Stops Engine **AUTOMATICALLY** when Oil Pressure Falls . . .

- Visible contacts and pressure gauge on one face
- See it work — you know it's working all the time
- Easy to install
- Simply screw into oil pressure line or on block. Run wire to magneto ground terminal.

GUARANTEED FOR ONE FULL YEAR

Sold by Engine Dealers and Supply Stores

FRANK W. MURPHY *Manufacturer*

BOX 1476 TULSA, OKLA

769 N. VINE ST. LOS ANGELES 38 CALIFORNIA

Always Cold Water **Gotkool** WATER CANS AND COOLERS

GOTT Water Coolers are the convenient way to keep drinking water handy to the worker, protect it from impurities. Their exclusive construction keeps water cool for long periods. Snug-fitting, large, removable top, handy, non-leaking, push-button faucet. GOTT Water Cans for handy field use. Your supply store has them, get one today!

GOTKOOL WATER CAN Made in 1½, 2, 3, 5, 10, 15 and 20 gallon sizes. Push - Button Faucet at slight additional cost.

GOTKOOL WATER COOLER Made in 2, 3, 5, 8, 10, 15 and 20 gallon sizes with Push-Button Faucet.

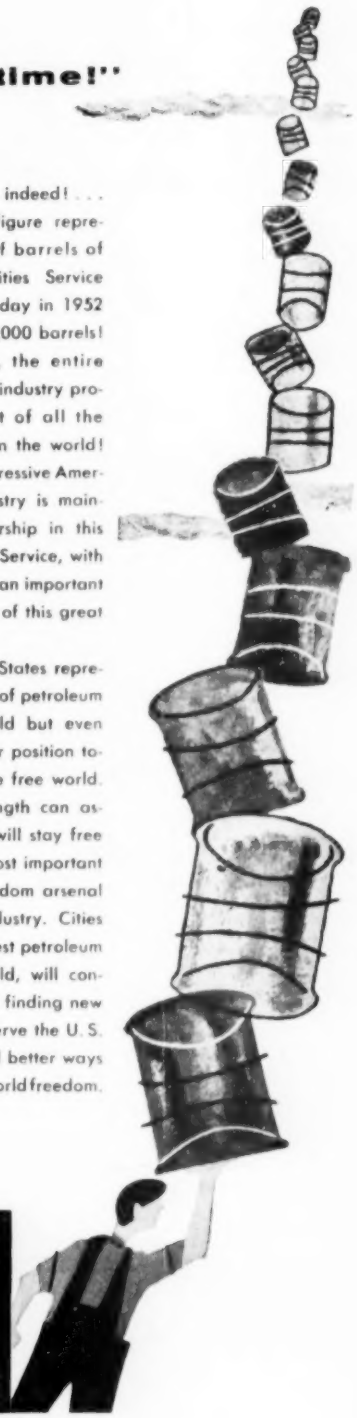
KEEP PURE DRINKING WATER ALWAYS HANDY

INSIST ON THE GENUINE . . . Look for the Blue and Black Label With the Name GOTKOOL in Red.

H. P. GOTT MFG. CO.

WINFIELD, KANSAS

"only **237,630** more to fill before quitting time!"



A good day's work indeed! . . . and that amazing figure represents the number of barrels of liquid petroleum Cities Service refined every single day in 1952 . . . a total of 86,735,000 barrels! In that same year, the entire American petroleum industry produced 54.3 percent of all the crude oil produced in the world!

Obviously, the aggressive American petroleum industry is maintaining world leadership in this vital field and Cities Service, with its vast production, is an important contributing member of this great petroleum family.

We in the United States represent the largest users of petroleum products in the world but even more important is our position today as leaders of the free world. Only our great strength can assure that our world will stay free . . . and one of the most important segments of our freedom arsenal is the petroleum industry. Cities Service, seventh largest petroleum company in the world, will continue to work toward finding new and better ways to serve the U. S. consumer . . . new and better ways to serve the cause of world freedom.

CITIES SERVICE

Colmonoy hard-faced thrust rings take severe wear in oil well fishing tools

The fishing tools manufactured by Houston Engineers, Inc. furnish the most dramatic proof that Colmonoy No. 6 hard-facing alloy can stand the most severe wear.

Eight Colmonoy No. 6 hard-faced rings receive the thrust and metal to metal wear of the two oppositely rotating halves of the tool, under pressures up to 70,000 lbs. Also present is the abrasiveness of drilling mud and sand, and impact suffered when a jarring action is made to free the buried pipe. Colmonoy No. 6 gives these rings a life 20 times longer than can be had without it.

Galling is evident on unprotected rings

Friction pads on the fishing tool, which guide it down the casing, are also hard-faced with Colmonoy No. 6. The smooth deposit requires no machining.

In both cases Colmonoy No. 6 was applied by oxy-acetylene welding, using 3/16" rod. It is free flowing and easy to apply. While its ability to resist extreme abrasion, impact, and galling, coupled with its low co-efficient of friction, indicates Colmonoy No. 6 as the only hard-facing to use in this instance, it also gives excellent resistance to corrosion, making it a natural choice for a multitude of oil field applications.

Colmonoy hard-faced ring is unmarked

Colmonoy alloys are available as bare and coated rods, castings, paste, and powder for use in the Spraywelder. There's a complete line of Colmonoy alloys, each resistant to a certain combination of abrasion, corrosion, impact, and heat. Write for more information.

Write us for the name of the nearest shop doing Sprayweld work. Write, too, for Hard-Facing Manual No. 77. It gives the characteristics of all Colmonoy alloys, and typical jobs on which they are used; also full information on the Sprayweld Process. Engineering Data Sheet No. 3 lists the many acids and alkalies which Colmonoy nickel-base alloys will resist. Write today!

HARD-FACING ALLOYS

19345 JOHN R STREET **WALL COLMONOY** DETROIT 3, MICHIGAN

CORPORATION

BRANCHES: BIRMINGHAM • BUFFALO • CHICAGO • HOUSTON
NEW YORK • LOS ANGELES • PITTSBURGH • MONTREAL

Review-Forecast Drilling by Counties

	Oil	Gas	Dry	Total	Footage
Comanche	0	1	3	4	20,825
Cowley	212	2	128	342	1,022,602
Decatur	10	0	10	20	77,299
Dickinson	2	0	1	3	7,024
Edward	1	0	0	1	4,584
Elk	0	0	2	2	5,602
Ellis	179	0	144	323	1,165,896
Ellsworth	28	0	13	41	135,844
Finney	4	73	3	80	232,446
Gove	4	0	1	5	21,757
Graham	56	0	47	103	393,467
Grant	0	6	0	6	16,174
Greenwood	91	0	47	138	279,214
Hamilton	0	11	0	11	28,760
Harper	1	1	2	4	18,314
Harvey	3	2	5	10	34,276
Haskell	0	28	2	30	82,390
Hodgeman	0	0	1	1	4,558
Kearny	0	73	2	75	200,528
Kingman	13	0	8	21	89,476
Kiowa	0	0	1	1	5,260
Lane	1	0	0	1	4,431
Lyon	22	0	8	30	72,266
McPherson	34	1	20	55	165,657
Marion	24	0	20	44	115,703
Meade	7	6	10	23	135,407
Morris	3	0	1	4	8,285
Morton	3	62	6	71	212,616
Nemaha	4	0	2	6	17,327
Ness	1	0	3	4	17,827
Norton	23	0	6	29	109,533
Osborne	0	0	3	3	10,894
Pawnee	70	4	38	112	436,413
Phillips	7	0	8	15	53,679
Pratt	73	1	42	116	485,657
Reno	6	1	18	25	93,555
Rice	101	0	78	179	595,666
Rooks	114	0	109	223	789,746
Russell	208	1	87	296	861,851
Rush	13	1	10	24	89,645
Saline	74	0	20	94	302,291
Sedgwick	15	0	12	27	83,602
Seward	2	23	5	30	120,549
Sheridan	9	0	6	15	61,608
Stafford	185	1	154	340	1,294,550
Stanton	0	29	0	29	69,453
Stevens	0	4	0	4	10,955
Sumner	33	0	33	66	229,660
Trego	30	0	26	56	218,624
Waubaunsee	0	0	1	1	3,190
Woodson	27	0	15	42	68,157
Total	2,113	343	1,440	3,896	12,834,172

MISSOURI
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
St. Louis	2	0	8	10	11,792

EASTERN NEBRASKA
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Richardson (Total)	2	0	3	5	13,627

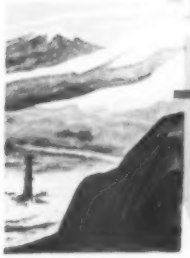
NEBRASKA
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Polk	0	0	1	1	2,647
Richardson	1	0	3	4	11,169
Stanton	0	0	1	1	2,390
Brown	0	0	1	1	2,230
Total	1	0	6	7	18,436

WESTERN NEBRASKA
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Arthur	0	0	2	2	6,874
Banner	0	0	1	1	6,698
Box Butte	0	0	3	3	13,199
Buffalo	0	0	1	1	4,118
Chase	0	0	2	2	9,085
Cherry	0	0	1	1	3,229
Cheyenne	12	4	53	69	348,930
Dawes	0	0	4	4	13,109
Deuel	0	1	5	6	22,149
Frontier	0	0	2	2	6,677
Furnas	0	0	1	1	3,597
Gosper	0	0	1	1	3,139
Grant	0	0	1	1	2,701
Hayes	0	0	1	1	4,359

LEE C. Moore WORLD WIDE *SERVICE...*



Lee C. Moore engineering and servicing facilities are available to the oil industry around the world. Wherever men drill for oil you'll find Lee C. Moore masts, derricks and other structures.

Depend upon Lee C. Moore drilling structures and service no matter where you intend to drill.

LEE C. Moore CORPORATION

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EASY DOES IT

Easy is the word for Naylor light-weight pipe in oil field operations. It's easy to handle. It's easy to transport. It's easy to install—even over rough terrain. That's one reason why field crews like to work with this distinctive lockseamed spiral-welded pipe.

Write for Bulletin No. 507..

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Exclusive Distributors in Mid-Continent and Gulf Coast Areas

Mid-Continent Supply Company, Fort Worth, Texas and Branches

Review-Forecast Drilling by Counties

	Oil	Gas	Dry	Total	Footage
Kearney	0	0	1	1	4,194
Keith	0	0	1	1	3,660
Kimball	8	0	33	41	262,774
Lincoln	0	0	3	3	11,001
Logan	0	0	1	1	3,837
McPherson	0	0	2	2	6,598
Morrill	0	0	3	3	13,137
Phelps	0	0	1	1	4,125
Red Willow	0	0	2	2	7,177
Scotts Bluff	0	0	2	2	13,096
Sioux	0	0	1	1	4,648
Valley	0	0	1	1	3,175
Total	20	5	129	154	785,286

WESTERN NEBRASKA

Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Banner	1	0	0	1	5,935
Cheyenne	41	7	16	64	305,235
Deuel	0	0	3	3	13,883
Kimball	58	0	22	80	489,244
Morrill	2	0	4	6	24,416
Total	102	7	45	154	838,713

MISSISSIPPI

Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Adams	9	0	32	41	284,840
Amite	0	0	6	6	44,753
Carroll	0	0	2	2	10,170
Chickasaw	0	2	2	4	15,829
Claiborne	0	0	2	2	13,042
Clarke	0	0	3	3	14,330
Clay	1	0	1	2	26,129
Copiah	0	0	2	2	20,602
Forrest	1	1	4	6	54,092
Franklin	2	0	13	15	94,828
George	0	0	1	1	8,237
Hancock	0	0	1	1	9,854
Harrison	0	0	1	1	9,500
Hinds	0	0	1	1	7,513
Itawamba	0	1	3	4	5,337
Jasper	0	0	3	3	19,803
Jefferson	4	0	31	35	231,017
Jones	1	0	3	4	36,211
Kemper	0	0	1	1	3,829
Lamar	0	0	2	2	18,458
Lee	0	0	1	1	4,240
Madison	0	0	3	3	22,296
Marion	0	0	4	4	39,270
Monroe	2	0	2	4	21,786
Newton	0	0	1	1	4,900
Pearl River	1	0	1	2	23,264
Perry	0	0	3	3	24,733
Pike	0	0	4	4	27,107
Pontotoc	0	0	1	1	2,378
Smith	0	0	3	3	32,007
Stone	0	0	1	1	18,180
Union	0	0	1	1	3,477
Walthall	0	0	3	3	31,915
Warren	0	0	2	2	13,887
Wayne	0	0	12	12	75,101
Wilkinson	2	1	22	25	194,251
Yazoo	0	0	1	1	7,215
Total	*23	5	179	207	1,468,381

*Includes 2 gas-condensate wells. One old well drilled deeper not included.

MISSISSIPPI

Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Adams	45	0	26	71	469,047
Amite	1	0	0	1	11,925
Chickasaw	0	0	1	1	7,026
Clarke	1	0	0	1	3,750
Forrest	9	0	2	11	92,210
Franklin	3	0	10	13	92,722
Jasper	5	0	1	6	31,200
Jefferson	23	1	8	32	185,384
Lamar	1	0	1	2	22,454
Lincoln	2	0	4	6	64,309
Madison	0	0	1	1	8,210
Marion	3	0	0	3	27,195
Monroe	0	5	3	8	38,781
Pearl River	0	0	2	2	18,074
Perry	1	0	2	3	23,409
Simpson	0	1	0	1	8,215
Wayne	11	0	6	17	104,023

Review-Forecast Drilling by Counties

	Oil	Gas	Dry	Total	Footage
Wilkinson	4	0	4	8	57,630
Yazoo	2	0	1	3	15,791
Total	*111	7	72	190	1,281,355

*Includes 11 gas-condensate wells. One old well drilled deeper not included.

ALABAMA
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Baldwin	0	0	4	4	26,443
Clarke	0	0	14	14	69,341
Coffee	0	0	4	4	14,633
Conecuh	0	0	2	2	9,560
Covington	0	0	1	1	4,517
Crenshaw	0	0	1	1	3,805
Escambia	1	0	29	30	185,725
Geneva	0	0	1	1	3,829
Houston	0	0	1	1	6,007
Lamar	0	0	2	2	6,323
Marengo	0	0	1	1	2,675
Mobile	0	0	1	1	8,015
Monroe	0	0	8	8	37,465
Pike	0	0	3	3	9,664
Sumpter	0	0	1	1	4,010
Washington	0	0	1	1	6,926
Total	1	0	74	75	398,938

One old well drilled deeper not included.

ALABAMA
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Choctaw	5	0	7	12	43,069
Escambia	11	0	5	16	99,491
Total	16	0	12	28	142,560

FLORIDA
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Bay	0	0	3	3	14,851
Calhoun	0	0	1	1	5,002
Escambia	0	0	1	1	7,512
Franklin	0	0	2	2	4,856
Glades	0	0	1	1	13,424
Hendry	0	0	3	3	17,032
Jackson	0	0	1	1	4,113
Lee	0	0	2	2	25,734
Monroe	0	0	2	2	16,559
Okaloosa	0	0	2	2	11,745
Santa Rosa	0	0	8	8	54,831
Walton	0	0	2	2	10,097
Washington	0	0	2	2	9,741
Total	0	0	30	30	195,497

GEORGIA
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Clinch	0	0	1	1	4,588
Decatur	0	0	1	1	2,631
Glynn	0	0	1	1	4,615
Telfair	0	0	1	1	4,008
Walker	0	0	2	2	2,143
Wheeler	0	0	1	1	3,614
Total	0	0	7	7	21,599

OKLAHOMA
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Atoka	2	0	3	5	3,479
Beaver	5	2	4	11	65,971
Beckham	51	0	6	57	554,606
Bryan	5	0	6	11	21,382
Caddo	70	4	14	88	318,381
Canadian	0	1	0	1	10,828
Carter	497	11	75	583	2,614,702
Cimarron	1	16	5	22	104,626
Cleveland	19	0	8	27	197,870
Coal	6	0	6	12	65,119
Comanche	56	1	41	98	115,486
Cotton	19	0	25	44	84,987
Creek	360	6	156	522	1,371,324
Delaware	0	0	1	1	96
Garfield	34	4	36	74	286,795
Garvin	271	2	58	331	2,229,283
Grady	27	4	7	38	160,894
Grant	10	0	13	23	121,337
Hughes	89	9	57	155	407,395
Jackson	13	0	10	23	42,661
Jefferson	25	0	13	38	52,377
Kay	102	5	66	173	569,072
Kingfisher	6	0	3	9	67,554
Kiowa	2	1	4	7	19,413
Lincoln	445	13	162	620	2,377,328
Logan	94	6	68	168	910,722
Love	1	0	3	4	14,107
McClain	19	0	7	26	223,909
McCurtain	1	0	9	10	7,185
McIntosh	4	6	1	11	27,128
Major	2	1	1	4	27,912
Marshall	7	0	10	17	28,626
Murray	1	0	0	1	4,520
Muskogee	19	1	31	51	80,148
Noble	53	7	59	119	404,949
Okfuskee	165	17	109	291	767,837
Oklahoma	58	3	25	86	527,109
Okmulgee	155	12	116	283	497,211
Osage	370	3	202	575	1,256,048
Pawnee	149	1	62	212	575,705
Payne	122	4	88	214	770,541
Pittsburg	1	2	1	4	4,636
Pontotoc	352	35	176	563	1,014,652
Pottawatomie	73	2	65	140	564,859
Seminole	202	11	119	332	936,558
Stephens	493	14	119	626	1,910,295
Texas	0	97	7	104	285,957
Tillman	2	0	4	6	17,260
Wagoner	12	1	11	24	28,263
Washita	5	0	1	6	62,186
Woods	0	0	1	1	6,528
Total	*4,475	302	2,074	6,851	22,817,819

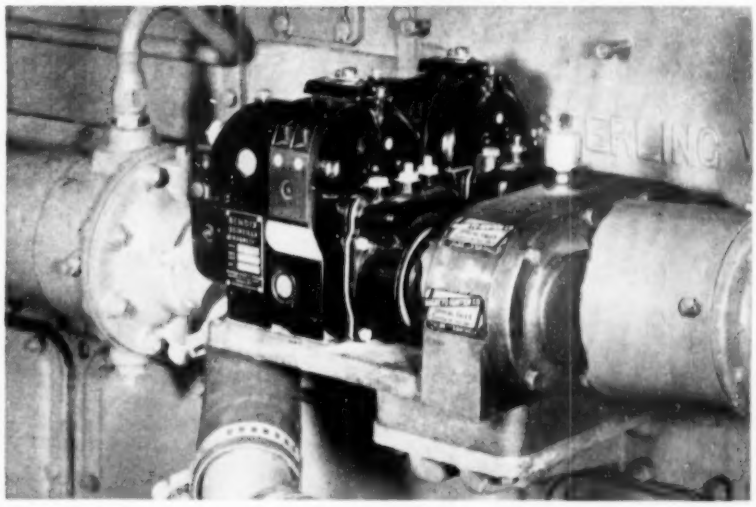
*Includes 52 condensate wells.

OKLAHOMA
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Alfalfa	0	0	2	2	12,438
Atoka	1	0	6	7	8,225
Beaver	2	3	6	11	76,266
Beckham	1	0	1	2	18,572
Bryan	0	0	2	2	4,740
Caddo	1	0	3	4	28,954
Canadian	0	0	1	1	8,712
Carter	3	0	8	11	51,410

Ball Bearing

MAGNETO BRACKET AND GEAR BOX



For replacing Battery Ignition System on Sterling Viking 8-Cylinder Engine.

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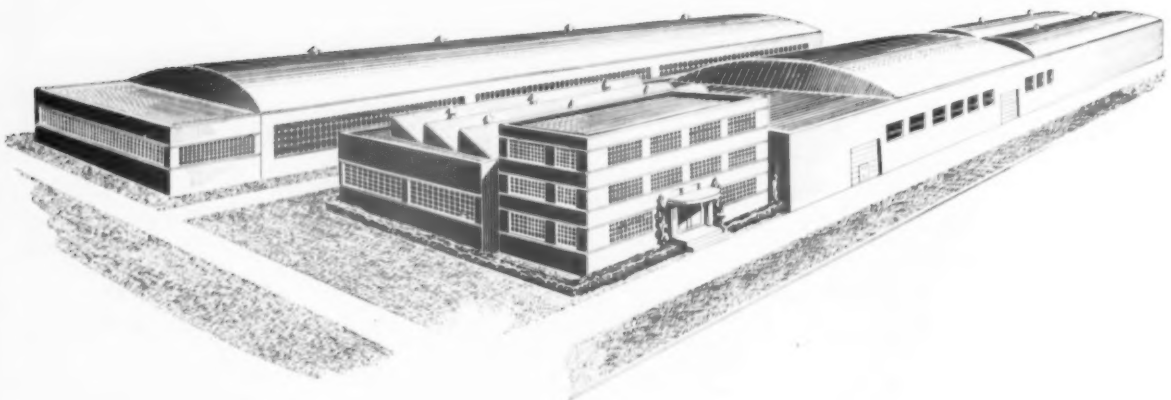
Sargent OIL

Standard of Excellence for 30 Years



SARGENT ENGINEERING CORPORATION'S MODERN PLANT

WELL PUMPS

SALES AND SERVICE NOW AVAILABLE THROUGH SARGENT FIELD STORES

In order to provide Sargent Pump users with *better sales and service* facilities, Sargent Engineering Corporation has established its own field stores in principal Mid-Continent producing areas. This important step is part of a continuing program of development that has been successfully carried on since the Company was founded.

Each field store is prepared to supply you with the pump best suited to the individual requirements of your wells and to give you the service that will keep your pumps operating longer.

Lifting more oil at lower cost has established Sargent Pumps as the *standard of excellence* for more than thirty years.

CALIFORNIA	Long Beach Bakersfield Santa Maria Ventura Taft Huntington Park	NEW MEXICO	Hobbs
		KANSAS	Chase Russell
OKLAHOMA	Oklahoma City Pawhuska Seminole Tulsa	ILLINOIS	Grayville
TEXAS	Odessa Snyder Houston Sundown Wichita Falls Quitman	ARKANSAS	Magnolia
		COLORADO	Rangely

SARGENT ENGINEERING CORPORATION
MAIN OFFICE AND PLANT • 2533 EAST FIFTY-SIXTH STREET
HUNTINGTON PARK, CALIFORNIA

Sargent

Review-Forecast Drilling by Counties

	Oil	Gas	Dry	Total	Footage
Cimarron	2	18	3	23	111,142
Cleveland	3	0	6	9	72,420
Coal	2	1	6	9	54,485
Comanche	1	0	8	9	14,194
Cotton	0	0	16	16	34,614
Creek	2	1	10	13	42,924
Dewey	0	0	1	1	8,751
Ellis	0	0	2	2	22,404
Garfield	5	0	13	18	109,088
Garvin	9	0	21	30	175,418
Grady	2	0	4	6	45,198
Grant	2	0	8	10	57,215
Harmon	0	0	3	3	13,177
Harper	0	0	1	1	6,500
Hughes	3	0	11	14	43,208
Jackson	0	0	12	12	46,678
Jefferson	0	0	17	17	50,722
Johnston	0	0	2	2	6,373
Kay	6	0	33	39	165,451
Kingfisher	1	0	3	4	32,609
Kiowa	1	0	3	4	10,348
Latimer	0	0	2	2	4,775
LeFlore	0	0	2	2	8,304
Lincoln	14	3	68	85	392,762
Logan	6	1	37	44	254,477
Love	0	0	6	6	37,065
Major	0	0	1	1	8,720
Marshall	0	0	3	3	19,553
McClain	6	0	4	10	102,184
McCurtain	0	0	22	22	13,843
McIntosh	0	0	2	2	7,637
Murray	1	0	7	8	17,977
Noble	5	0	16	21	87,902
Okfuskee	1	2	15	18	65,940
Oklahoma	2	1	10	13	75,467
Okmulgee	1	0	0	1	3,299
Osage	6	0	28	34	97,154
Pawnee	1	1	27	29	101,334
Payne	5	0	22	27	127,384
Pittsburg	0	1	4	5	13,789
Pontotoc	4	0	31	35	76,674
Pottawatomie	8	0	17	25	132,493
Roger Mills	0	0	1	1	12,384
Seminole	8	0	8	16	49,036
Sequoyah	0	0	2	2	3,327
Stephens	3	0	17	20	93,543
Texas	1	4	5	10	51,142
Tillman	1	0	8	9	29,175
Washita	1	1	1	3	33,023
Woods	0	0	2	2	14,853
Woodward	0	0	4	4	36,505
Total	121	37	584	742	3,303,957

EASTERN KENTUCKY
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Bell	0	3	3	6	19,060
Carter	0	0	1	1	988
Clay	0	0	1	1	3,543
Greenup	0	0	1	1	1,247
Harlan	0	0	1	1	4,355
Jackson	0	0	1	1	948
Lee	0	0	1	1	948
Morgan	0	0	2	2	1,896
Wolfe	0	0	1	1	1,258
Robertson	0	0	1	1	1,000
Total	0	3	13	16	35,243

EASTERN KENTUCKY
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Breathitt	0	0	1	1	2,583
Elliott	4	0	0	4	3,618
Floyd	0	14	2	16	26,154
Johnson	4	2	1	7	9,697
Knott	0	31	6	37	115,154
Lee	6	0	0	6	6,549
Letcher	0	9	1	10	35,828
Magoffin	2	20	2	24	28,892
Martin	0	12	2	14	41,256
Menifee	1	0	0	1	591
Perry	0	2	0	2	5,334
Pike	3	96	12	111	373,974
Powell	4	0	1	5	6,744
Wolfe	4	0	2	6	6,472
Total	28	186	30	244	662,846

TENNESSEE
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Clay	0	0	6	6	3,270
Cumberland	0	0	1	1	2,020
Fentress	1	0	1	2	3,334
Lake	0	0	1	1	2,590
Macon	0	0	1	1	1,531
Montgomery	0	0	1	1	1,315
Pickett	0	0	1	1	2,085
Robertson	1	0	1	2	2,902
Scott	0	0	1	1	1,285
Sumner	0	0	3	3	835
Wayne	0	0	1	1	2,900
Total	2	0	18	20	24,067

TENNESSEE
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Pickett	2	0	1	3	1,962
Robertson	2	1	1	4	5,523
Total	4	1	2	7	7,485

ILLINOIS
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Bond	0	0	12	12	19,716
Brown	0	0	1	1	968
Champaign	0	0	2	2	3,715
Christian	0	0	10	10	25,356
Clark	0	0	19	19	24,600
Clay	0	0	22	22	86,412
Clinton	0	0	37	37	58,274
Coles	0	0	7	7	5,244
Crawford	0	0	11	11	15,210
Cumberland	0	0	3	3	3,626
Edgar	0	0	7	7	4,354
Edwards	1	0	12	13	42,604
Effingham	0	0	8	8	22,117
Fayette	0	0	6	6	13,050
Franklin	0	0	5	5	15,831
Gallatin	0	0	10	10	27,511
Hamilton	0	0	13	13	44,210
Hancock	0	0	2	2	1,005
Hardin	0	0	1	1	2,948
Jackson	0	0	3	3	3,802
Jasper	0	0	11	11	28,736
Jefferson	0	0	10	10	28,753
Knox	0	0	1	1	1,435
Lawrence	1	0	12	13	26,653
Macon	0	0	4	4	11,389
Macoupin	0	0	8	8	5,230
McDonough	0	0	2	2	874
Madison	0	0	15	15	19,455
Marion	0	0	13	13	30,408
Montgomery	0	0	13	13	24,137
Morgan	0	0	3	3	1,910
Moultrie	0	0	2	2	4,327
Peoria	0	0	1	1	1,365
Perry	0	0	7	7	16,916
Randolph	0	0	4	4	6,388
Richland	0	0	22	22	55,373
Saline	0	0	1	1	3,150
Shelby	0	0	3	3	7,255
St. Clair	0	0	7	7	13,067
Wabash	0	0	7	7	18,114
Washington	0	0	28	28	57,558
Wayne	12	0	26	38	82,656
White	2	0	18	20	72,700
Total	16	0	409	425	938,402

ILLINOIS
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Bond	0	0	3	3	5,572
Christian	19	0	2	21	47,500
Clark	6	0	13	19	14,286
Clay	51	0	45	96	277,682
Clinton	11	0	17	28	38,237
Coles	2	0	4	6	8,676
Crawford	30	0	34	64	78,024
Cumberland	2	0	5	7	4,843
Edgar	6	0	7	13	7,445
Edwards	72	0	40	112	341,619
Effingham	3	0	7	10	21,932
Fayette	6	0	5	11	19,887
Franklin	8	0	4	12	33,665
Gallatin	46	0	24	70	186,175
Hamilton	52	0	41	93	304,143
Jasper	6	0	14	20	55,738
Jefferson	23	0	18	41	111,400
Lawrence	54	0	43	97	174,754
Macoupin	0	2	4	6	2,581
McDonough	1	0	1	2	949
Madison	13	0	25	38	24,653
Marion	85	0	24	109	224,576
Montgomery	0	0	2	2	1,658
Morgan	0	1	3	4	4,557
Perry	1	1	1	3	5,394
Randolph	17	0	1	18	40,529
Richland	32	0	22	54	165,374
Saline	23	0	16	39	113,355
Vermillion	0	0	1	1	2,515
Wabash	67	0	41	108	247,875
Washington	31	0	20	51	104,601
Wayne	254	0	103	357	1,148,971
White	133	0	92	225	667,401
Total	1,054	4	682	1,740	4,486,567

INDIANA
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Allen	0	0	1	1	1,471
Boone	0	2	0	2	2,147
Brown	0	0	1	1	1,511
Clay	0	0	4	4	5,799
Daviess	1	0	14	15	14,532
DeKalb	0	0	2	2	5,142
Dubois	4	0	43	47	59,216
Gibson	3	0	43	46	84,503
Greene	0	0	4	4	7,072
Harrison	0	0	1	1	1,080
Huntington	1	0	0	1	1,222
Knox	0	0	18	18	31,277
Madison	0	0	2	2	1,914
Marshall	0	0	1	1	1,512
Martin	0	0	3	3	1,515
Owen	0	0	1	1	1,469
Parke	0	0	3	3	3,790
Perry	2	0	10	12	8,002
Pike	4	0	19	23	33,881
Posey	2	0	29	31	96,538
Pulaski	0	0	1	1	912
Putnam	0	0	1	1	1,054
Spencer	3	0	52	55	76,747
Sullivan	0	0	33	33	49,369
Vanderburgh	1	0	9	10	17,504
Vigo	1	0	47	48	72,288
Warrick	0	0	6	6	9,053
Washington	0	0	1	1	2,002
Total	22	2	349	373	502,522

INDIANA
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Blackford	1	0	1	2	2,387
Daviess	4	0	9	13	12,331
Decatur	0	8	0	8	4,439
Delaware	14	0	20	34	50,434
Dubois	20	0	25	45	50,728
Elkhart	0	0	1	1	600
Gibson	85	1	96	182	370,261
Grant	0	0	1	1	1,116
Greene	1	2	3	6	8,671
Harrison	2	0	0	2	1,138
Henry	0	1	3	4	5,226
Huntington	2	0	2	4	4,199
Jay	2	0	4	6	7,935
Jennings	1	1	1	3	2,680
Knox	13	0	39	52	81,001
Madison	0	0	1	1	1,351
Martin	0	1	4	5	5,064
Miami	1	0	1	2	1,916
Monroe	1	0	0	1	1,767
Perry	1	0	6	7	5,085
Pike	93	0	72	165	216,098
Posey	119	0	77	196	445,742
Randolph	6	1	12	19	19,197
Rush	0	2	1	3	2,644
Shelby	2	1	0	3	2,670
Spencer	40	2	41	83	104,869
Sullivan	3	0	4	7	9,870
Vanderburgh	7	0	20	27	50,059
Vigo	12	0	5	17	30,923
Warrick	0	0	4	4	5,118
Wells	0	0	4	4	4,335
Total	430	20	457	907	1,509,854

MICHIGAN
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Allegan	1	0	25	26	39,658
Arenac	3	0	7	10	31,735
Antrim	0	0	1	1	1,660
Barry	0	0	2	2	3,980
Bay	0	0	6	6	18,227
Berrien	0	0	1	1	752
Branch	0	0	2	2	3,984

Review-Forecast Drilling by Counties

	Oil	Gas	Dry	Total	Footage
Calhoun	0	0	1	1	3,000
Cass	0	0	4	4	6,402
Charlevoix	0	0	1	1	1,159
Clare	3	0	3	6	30,108
Clinton	0	0	3	3	8,456
Crawford	0	0	1	1	4,002
Eaton	0	0	1	1	2,065
Genessee	0	0	1	1	2,792
Gladwin	0	0	1	1	4,122
Grand Traverse	0	0	2	2	13,682
Gratiot	1	0	4	5	10,800
Hillsdale	0	0	8	8	14,644
Huron	2	0	0	2	7,063
Ionia	0	0	1	1	2,960
Isabella	0	0	8	8	28,625
Jackson	1	0	10	11	19,743
Kalamazoo	0	0	2	2	2,843
Kalkaska	0	0	3	3	9,683
Kent	0	0	9	9	24,897
Lake	0	0	2	2	4,907
Lapeer	0	0	3	3	9,191
Lenawee	0	0	2	2	3,225
Livingston	0	0	2	2	4,985
Manistee	0	0	2	2	8,371
Mason	1	0	7	8	24,533
Mecosta	1	1	4	6	18,228
Midland	0	0	2	2	9,400
Missaukee	0	1	3	4	13,665
Montcalm	1	0	11	12	37,454
Montmorency	0	0	1	1	2,542
Muskegon	0	2	14	16	36,183
Newaygo	0	0	11	11	25,778
Oakland	0	0	2	2	4,749
Oceana	0	0	10	10	25,032
Ogemaw	1	0	2	3	11,796
Oscoda	0	0	1	1	4,330
Osceola	0	0	10	10	35,502
Ottawa	2	0	13	15	29,501
Otsego	0	0	3	3	8,072
St. Joseph	0	0	1	1	1,251
St. Clair	0	2	7	9	24,780
Saginaw	0	0	1	1	3,367
Sanilac	0	0	2	2	6,556
Shiawassee	0	0	1	1	2,278
Tuscola	0	0	2	2	7,041
Van Buren	3	0	23	26	29,496
Washtenaw	1	0	1	2	4,361
Wexford	0	0	2	2	7,105
Total	21	6	252	279	700,721

MICHIGAN
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Allegan	10	0	5	15	22,618
Arenac	5	0	2	7	19,566
Barry	9	0	0	9	16,807
Bay	12	0	6	18	50,930
Berrien	1	0	1	2	1,313
Clare	19	4	4	27	122,734
Crawford	1	0	0	1	4,275
Gladwin	10	0	8	18	69,494
Jackson	2	0	2	4	6,502
Kent	6	0	4	10	25,773
Mason	8	0	1	9	22,532
Mecosta	1	0	3	4	13,312
Midland	1	0	1	2	7,464
Missaukee	15	1	6	22	78,909
Montcalm	5	0	3	8	23,975
Muskegon	17	3	17	37	74,330
Newaygo	0	2	1	3	2,648
Oakland	0	1	0	1	734
Oceana	10	0	6	16	27,685
Ogemaw	31	1	10	42	172,828
Osceola	0	1	1	2	6,613
Ottawa	4	0	4	8	14,810
Roscommon	5	0	0	5	23,606
St. Clair	0	0	1	1	2,785
Tuscola	2	0	0	2	6,910
Van Buren	49	0	22	71	82,913
Total	223	13	108	344	902,066

OHIO
Wildcat Completions by Counties

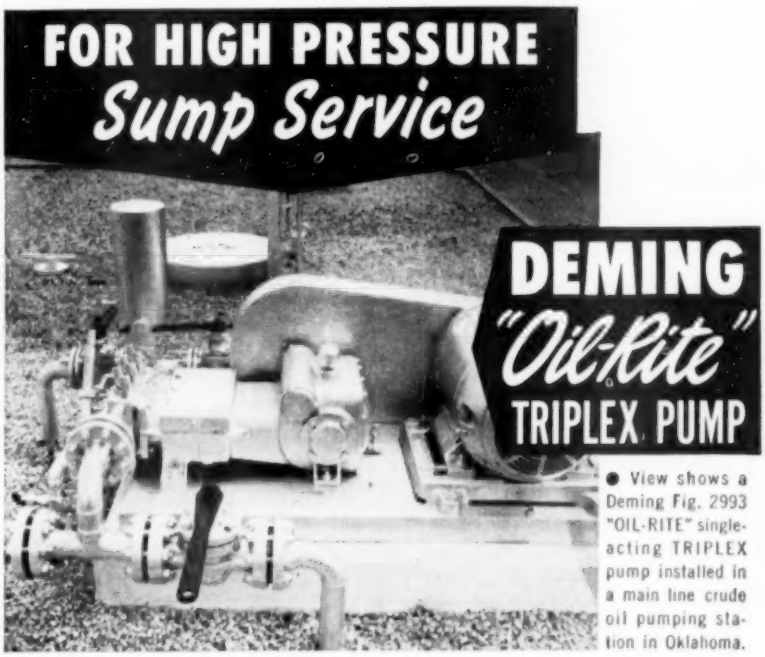
	Oil	Gas	Dry	Total	Footage
Coshocton	1	1	0	2	7,341
Holmes	0	0	1	1	3,988
Huron	0	0	2	2	6,734
Jefferson	0	0	1	1	6,860
Knox	0	0	1	1	4,617
Lake	0	2	0	2	4,540
Lawrence	0	0	2	2	5,891
Licking	1	1	1	3	7,854
Meigs	0	0	1	1	2,634
Morgan	0	0	1	1	3,757
Muskingum	0	0	1	1	3,236
Noble	0	1	1	2	9,176
Stark	0	0	1	1	5,448
Tuscarawas	0	1	0	1	862
Vinton	0	0	1	1	3,133
Total	2	6	14	22	76,070

OHIO
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Ashland-Lorain	87	30	141	258	423,231
Brush Creek-Zanesville	6	6	10	22	81,871
Cambridge	78	33	83	194	243,532
Lancaster	24	17	50	91	241,621
Mt. Vernon-Newark	227	36	67	330	861,421
Putnam	0	5	3	8	33,027
Sandyville	4	7	14	25	117,265
Stewart	32	30	38	100	120,185
Miscellaneous	9	6	15	30	55,703
Total	467	170	421	1,058	2,197,856

KENTUCKY
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Daviess	83	4	64	151	216,152
Grayson	0	0	1	1	1,990
Hancock	3	0	12	15	10,563
Henderson	95	0	97	192	429,651
Hopkins	4	0	10	14	39,922
Logan	0	0	1	1	1,802
McLean	62	0	30	92	192,704
Muhlenberg	16	0	30	46	70,423
Ohio	33	0	45	78	58,354
Todd	0	0	2	2	2,765



● View shows a Deming Fig. 2993 "OIL-RITE" single-acting TRIPLEX pump installed in a main line crude oil pumping station in Oklahoma.

Completely enclosed working parts in the power end of this Deming "OIL-RITE" pump are continuously lubricated by a splash system of oiling and fully protected. Non-corroding, wear-resistant materials are used for all vital parts. Here is a pump you can rely upon for trouble-free service and long life. The complete Deming line includes a diversity of pumps for the oil and gas industry. Name your pumping need. A Deming Distributor is ready to serve you.

THE DEMING COMPANY 559 BROADWAY SALEM, OHIO

DEMING pumps
FOR THE OIL AND GAS INDUSTRY

Review-Forecast Drilling by Counties

	Oil	Gas	Dry	Total	Footage
Union	6	0	11	17	33,772
Webster	53	0	45	98	211,362
Total	355	4	348	707	1,269,460

KENTUCKY
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Breckenridge	0	0	1	1	771
Christian	0	0	5	5	7,780
Crittenden	0	0	2	2	2,635
Daviess	2	0	35	37	57,991
Hancock	0	0	6	6	5,541
Henderson	6	0	42	48	117,541
Hopkins	0	0	18	18	45,068
Logan	0	0	6	6	10,441
McLean	3	0	11	14	31,000
Meade	0	0	2	2	1,970
Muhlenburg	2	1	23	26	45,902
Ohio	0	0	9	9	10,638
Todd	0	0	4	4	6,653
Union	0	0	11	11	25,089
Webster	2	0	6	8	18,223
Total	15	1	181	197	387,243

ARIZONA
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Navajo	0	0	1	1	4,523
Pinal	0	0	1	1	5,142
Total	0	0	2	2	9,665

COLORADO
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Adams	5	0	38	43	256,459
Archuleta	0	0	5	5	15,833
Baca	0	0	1	1	5,647
Boulder	0	0	1	1	2,803
Costilla	0	0	1	1	4,662
Delta	0	0	3	3	2,382
Douglas	0	0	3	3	2,880
Eagle	0	0	1	1	700
El Paso	0	0	6	6	16,877
Fremont	0	0	2	2	1,696
Garfield	0	0	3	3	21,397
Grand	0	0	2	2	10,235
Huerfano	0	0	1	1	550
Jackson	0	0	7	7	44,971
Kiowa	0	0	2	2	10,950
Kit Carson	0	0	3	3	16,073
La Plata	0	0	3	3	15,701
Larimer	0	0	3	3	20,536
Las Animas	0	0	1	1	2,495
Lincoln	0	0	1	1	4,195
Logan	9	6	86	101	513,504
Mesa	0	1	1	2	4,360
Moffat	1	2	7	10	63,702
Montezuma	0	0	1	1	1,250
Montrose	0	0	2	2	3,770
Morgan	4	1	38	43	248,880
Phillips	0	0	1	1	3,910
Prowers	0	0	2	2	11,765
Rio Blanco	0	1	8	9	27,274
Routt	0	0	2	2	6,715
Sedgwick	0	1	3	4	14,791
Washington	1	0	47	48	240,292
Weld	10	0	32	42	295,572
Yuma	0	0	5	3	23,615
Total	30	12	322	364	1,916,452

COLORADO
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Adams	50	0	18	68	366,434
Boulder	0	0	1	1	2,453
Jackson	0	0	1	1	7,454
La Plata	0	37	4	41	110,789
Logan	72	6	29	107	552,683
Moffat	0	2	1	3	24,822
Montezuma	0	0	1	1	690
Morgan	5	1	2	8	41,977
Rio Blanco	3	1	3	7	30,897
Washington	76	4	18	98	532,801
Weld	22	0	13	35	242,645
Total	228	51	91	370	1,913,645

IDAHO
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Jefferson	0	0	1	1	458
Teton	0	0	1	1	12,720
Washington	0	0	1	1	2,800
Total	0	0	3	3	15,978

MONTANA
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Beaverhead	0	0	1	1	11,213
Big Horn	0	0	8	8	47,845
Blaine	0	0	2	2	7,278
Carbon	2	0	6	8	45,715
Cascade	0	0	2	2	1,640
Chouteau	0	0	4	4	12,081
Daniels	0	0	3	3	27,876
Dawson	2	0	4	6	55,024
Fallon	1	0	3	4	37,162
Fergus	0	0	6	6	22,070
Garfield	0	0	3	3	24,307
Glacier	0	0	2	2	5,476
Golden Valley	0	0	4	4	16,664
Hill	0	0	1	1	5,416
Judith Basin	0	0	1	1	2,045
Liberty	0	0	3	3	8,768
McCone	2	0	10	12	114,604
Musselshell	2	0	3	5	28,449
Petroleum	0	0	3	3	5,918
Phillips	0	0	3	3	15,153
Pondera	0	0	1	1	3,167
Prairie	0	0	2	2	18,621
Richland	1	0	2	3	30,364
Roosevelt	1	0	7	8	50,470
Rosebud	0	0	8	8	50,646
Sanders	0	0	2	2	3,177
Sheridan	0	0	3	3	26,962
Stillwater	0	0	2	2	13,695
Teton	0	0	5	5	15,279
Toole	1	0	3	4	10,645
Treasure	0	0	1	1	5,200
Valley	0	0	2	2	13,975
Wheatland	0	0	1	1	7,766
Yellowstone	0	0	3	3	21,512
Total	12	0	114	126	766,183

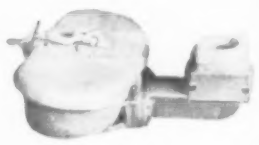
EVER SEE TANK STORAGE *Profits* LITERALLY DISAPPEAR INTO THIN AIR?

Faulty venting on lease storage tank is costing YOU money. The A.P.I. gravity drop on a lease producing 100 barrels per day is 1°. At 2¢ per barrel that's a $2.00 loss daily, and that's not all! The experts say there will also be a volume loss of 2½% on standard 36° crude. So that's an additional drain of $7.05 per day based on the current market value of $2.82 per barrel. A total of $9.05 each day or $3,303.25 unrecoverable vapor loss each year.

YOU CAN STOP THIS LOSS . . .

The Enardo Manufacturing Company has developed and tested a vapor control system that can immediately cut these needless losses. Enardo pressure-vacuum tank hatches (dead weight or spring loaded) are available for wood, bolted or welded tanks. A vent line is connected to each hatch by means of a bypass check valve. Whenever a tank is opened for gauging or thiefing the check seals off the vent line, isolating the tank. When the hatch is closed the vapor pressure in the other tanks immediately equalizes and puts pressure on the tank just gauged. Thus, pressure is kept on the entire battery at all times with a minimum of valuable vapor loss.

ENARDO No. 570 LB VAPOR CONTROL HATCH



ENARDO No. 530 VAPOR CONTROL HATCH

THE ENARDO 1900 SERIES IN-LINE VENT VALVE

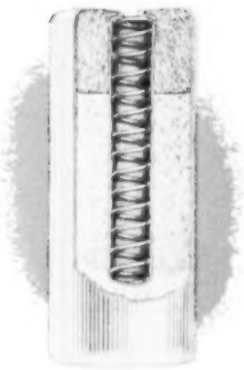
The Enardo 1900 series diaphragm type in-line vent valve has been specifically designed to work in conjunction with the Enardo Vapor Control Hatches. This valve accurately controls the gases in the connecting vent line without metering, vibration or hammering. Available in 2", 3" and 4" diameters with pressure ranges from 2 to 16 ounces. Standard vacuum setting of .4 ounces. FOR COMPLETE DETAILS AND PRICES ON THE ENARDO VAPOR CONTROL SYSTEM WRITE . . .

ENARDO manufacturing company

BOX 1647 • TULSA, OKLAHOMA

PROTECTED

right from the start



Starting time is toughest for engines, too. That's when they really need protection. When the lube oil is cold and viscous many filters won't accept it . . . send it through the by-pass without any filtration. Then, if the oil has been contaminated, or any part of the engine fails, there is no protection for critical surfaces. The power plant goes down . . . and repair costs go up.

You can use Winslow full-flow filters with complete assurance that oil will be filtered . . . Hot or Cold . . . right from the start. Winslow's exclusive CP* design provides automatic pressure regulation within the element, so that oil is by-passed only under emergency conditions. CP construction gives greater porosity near the outer edge, so that large particles are trapped first. Smaller contaminants are removed as the oil passes through denser filtering media near the center. This progressive filtration is clearly superior to any element that traps all sizes of particles on the outer surface, which becomes clogged and reduces the capacity of the filter.

**CP is the title of a helpful and informative booklet available from Winslow Engineering Company. Why not write today for your copy?*

WINSLOW FILTERS

Winslow Engineering Company 4069 Hollis Street • Oakland 8, California

Every Evening from New Orleans

Caracas now has its long-awaited $1,000-a-foot *autopista*, cutting driving time from Maiquetia airport from an hour and a half to 15 minutes.

And providing U.S. oil centers with similar time economy to Maiquetia is the Delta-C&S *aero-pista*, with 300 mph Constellations leaving New Orleans every evening at 7:25, with stops at Havana and Montego Bay, Jamaica.

Fastest—Most Direct from:

HOUSTON—DALLAS
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AIR LINES

General Offices: Atlanta, Ga.

Review-Forecast
Drilling by Counties

MONTANA

Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Big Horn	6	0	3	9	40,444
Blaine	22	1	3	26	83,001
Carbon	1	0	3	4	22,836
Dawson	12	0	2	14	133,210
Fallon	2	0	2	4	20,896
Fergus	0	0	1	1	751
Glacier	29	4	13	46	138,516
Liberty	7	7	12	26	71,329
McCone	4	0	4	8	66,669
Musselshell	1	0	5	6	18,514
Petroleum	0	0	2	2	2,619
Pondera	20	1	9	30	64,317
Roosevelt	24	0	4	28	167,425
Roseland	21	0	8	29	144,534
Teton	3	0	2	5	11,704
Toole	51	1	19	71	124,879
Valley	0	8	0	8	6,641
Wibaux	4	0	1	5	45,753
Yellowstone	2	0	1	3	3,062
Total	209	22	94	325	1,167,130

NEVADA

	Oil	Gas	Dry	Total	Footage
Wildcat Completions by Counties					
Elko	0	0	3	3	5,510

NORTH DAKOTA

Wildcat Completions by Counties

Williams	2	0	4	6	50,156
Barnes	0	0	2	2	4,263
Billings	1	0	0	1	13,325
Bottineau	5	0	18	23	80,126
Cavalier	0	0	2	2	2,761
Divide	0	0	1	1	6,957
Eddy	0	0	1	1	4,235
Foster	0	0	4	4	12,847
Grant	0	0	1	1	6,798
Kidder	0	0	1	1	5,144
McHenry	0	0	3	3	11,640
McKenzie	3	0	6	9	97,423
McLean	0	0	1	1	7,222
Mercer	0	0	1	1	9,000
Morton	0	0	1	1	5,345
Mountrail	0	0	2	2	18,896
Pembina	0	0	1	1	1,398
Pierce	0	0	2	2	6,872
Ramsey	0	0	6	6	20,110
Renville	0	1	6	7	6,857
Rolette	0	0	2	2	10,453
Sheridan	0	0	1	1	3,993
Slope	0	0	1	1	11,152
Stark	0	0	1	1	10,480
Stutsman	0	0	2	2	6,609
Towner	0	0	2	2	8,482
Ward	0	0	2	2	17,041
Wells	0	0	5	5	20,594
Total	11	1	79	91	463,389

NORTH DAKOTA

Development Completions by Counties

Billings	1	0	0	1	9,451
Bottineau	2	0	2	4	9,817
McKenzie	2	0	1	3	29,580
Mountrail	44	0	4	48	400,488
Burke	1	0	0	1	8,235
Williams	111	0	11	122	1,041,175
Total	161	0	18	179	1,498,746

NORTHERN NEW MEXICO

Wildcat Completions by Counties

Rio Arriba	0	11	11	22	123,500
Sandoval	3	1	6	10	37,090
San Juan	0	1	7	8	45,049
San Miguel	0	0	1	1	3,113
Valencia	0	0	1	1	12,691
Total	3	13	26	42	221,443

NORTHERN NEW MEXICO

Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Rio Arriba	5	53	4	62	202,684
Sandoval	0	0	1	1	3,787
San Juan	3	495	24	522	2,194,497
Total	8	548	29	585	2,400,968

Review-Forecast
Drilling by Counties

SOUTH DAKOTA
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Butte	0	0	1	1	7,772
Carson	0	0	2	2	11,644
Custer	0	0	2	2	10,625
Dewey	0	0	2	2	12,316
Fall River	0	0	1	1	2,865
Haakon	0	0	2	2	9,990
Harding	0	0	2	2	17,445
Kingsbury	0	0	1	1	1,095
Miner	0	0	1	1	1,330
Perkins	0	0	1	1	7,318
Potter	0	0	1	1	3,715
Stanley	0	0	1	1	3,900
Yankton	0	0	1	1	928
Zieback	0	0	2	2	11,642
Total	0	0	20	20	102,585

UTAH
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Carbon	0	2	2	4	19,615
Duchesne	1	0	5	6	46,678
Emery	0	2	7	9	42,799
Grand	0	0	2	2	9,693
San Juan	0	0	3	3	13,694
Sevier	0	0	4	4	15,121
Uintah	2	0	11	13	78,399
Wasatch	0	0	1	1	10,000
Total	3	4	35	42	235,999

UTAH
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Carbon	0	4	4	8	36,058
Duchesne	1	0	1	2	12,000
Emery	0	0	1	1	9,260
Uintah	13	1	3	17	102,185
Total	14	5	9	28	159,683

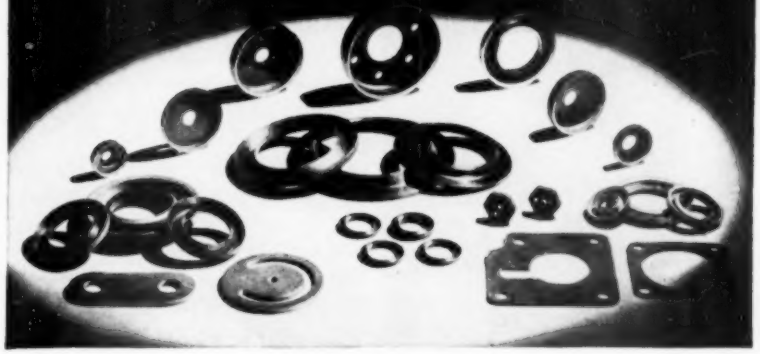
WYOMING
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Big Horn	4	0	21	25	113,479
Campbell	0	0	2	2	14,309
Carbon	1	1	7	9	44,874
Converse	1	0	5	6	34,454
Crook	2	0	3	5	15,198
Fremont	3	0	17	20	73,072
Goshen	0	0	1	1	4,506
Hot Springs	3	0	8	11	56,410
Johnson	3	0	14	17	109,702
Laramie	0	0	3	3	19,108
Lincoln	0	0	1	1	3,250
Natrona	2	0	12	14	55,495
Niobrara	0	0	16	16	66,203
Park	3	0	3	6	38,447
Platte	0	0	1	1	2,310
Sheridan	0	0	3	3	19,195
Sublette	0	2	3	5	16,183
Sweetwater	0	0	4	4	27,339
Uinta	0	0	1	1	2,201
Washakie	1	0	15	16	91,320
Weston	5	0	18	23	128,928
Total	28	3	158	189	935,958

WYOMING
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Big Horn	18	0	6	24	135,516
Carbon	5	1	2	8	44,975
Converse	66	1	10	77	515,524
Crook	1	0	2	3	10,430
Fremont	56	1	3	60	180,457
Hot Springs	100	0	10	110	432,588
Johnson	71	4	20	95	321,455
Laramie	1	0	1	2	17,570
Natrona	36	2	15	53	179,778
Niobrara	4	0	10	14	53,020
Park	15	0	4	19	80,926
Sheridan	7	0	0	7	32,821
Sublette	2	9	3	14	35,118
Sweetwater	1	3	1	5	28,653
Uinta	0	1	1	2	25,678
Washakie	3	0	2	5	26,053
Weston	208	0	22	230	1,280,945
Total	594	22	112	728	3,401,497

GARLOCK Service-Tested
LEATHER PACKINGS



Available in ALL SHAPES, ALL SIZES, ALL TANNAGES and ALL TREATMENTS

GARLOCK's modern, completely equipped leather packing manufacturing plant has the facilities to furnish *all types* of leather packings. This plant maintains the same high standards of materials, design, workmanship, and inspection that Garlock has upheld for the past 66 years in the manufacture of mechanical packings.

SHAPES

Molded Cups **"U" Packings**
"V" Packings **Washers** **Gaskets**
Discs **Flange or Hat Packings**

SIZES

All sizes suitable for leather packing applications from 1/8" O.D. (such as leather washers for needle valves) to 99" O.D. (such as large "U" packings for heavy duty hydraulic service).

TANNAGES

Oak **Chrome** **BITAN***

Garlock Bitan combines the heat and oil-resisting qualities of chrome with the fine grain, non-porous, strong qualities of oak.

TREATMENTS

Oil, grease, or wax treated (and combinations of these impregnants)—in degrees of hardness from extremely soft and flexible to very hard and rigid.

Synthetic rubber impregnated—combines the high tensile strength of leather and elasticity of rubber, and gives greater temperature resistance.

With fabric liners.

Untreated—for certain low pressure water applications.

Put your leather packing problems up to Garlock. Contact your Garlock representative or write for leather packing folder today. *Registered Trademark

THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK

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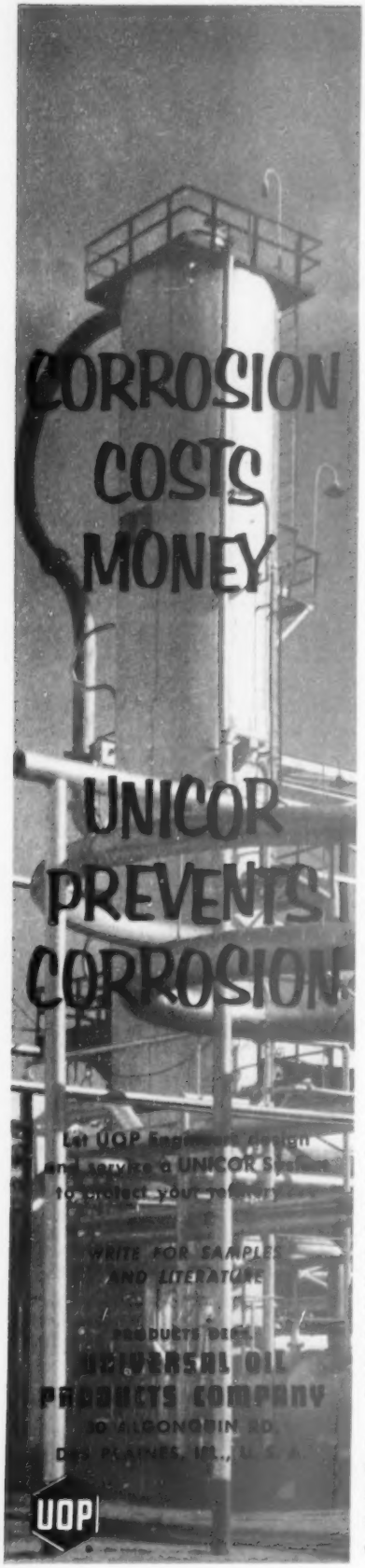
GARLOCK

PACKINGS, GASKETS, OIL SEALS
MECHANICAL SEALS
RUBBER EXPANSION JOINTS



The Control of Corrosion In Crude Units With Unicor

Corrosion of steel or Admiralty tubes in crude unit exchangers and condensers is a common problem. Corrosion is usually caused by hydrogen sulfide and hydrochloric acid. Hydrogen sulfide may occur in sour crudes, but is also formed by the decomposition of unstable sulfur compounds. Hydrochloric acid is formed by the hydrolysis and partial dissociation of magnesium and calcium chloride. Magnesium chloride hydrolyzes most completely; calcium chloride less completely, and sodium chloride not at all.

Even at the low salt content of three pounds per 1,000 barrels, receiver water may be very acid, registering a pH as low as 2-3. Ammonia is commonly injected above the top tray to neutralize excessive acidity. It is desirable to limit the use of ammonia to trim costs and reduce the deposit of ammonium salts on plates and tubes. For good corrosion control, it is necessary to maintain pH between 6.5 and 7.5. In plant operation it is often difficult to control pH closer than about 3 units. This wide variation causes steel corrosion under acid conditions and Admiralty attack under alkaline.

The injection of Unicor as a primary preventive supplemented by the limited use of ammonia is a new and highly effective means of corrosion control.

Unicor is a surface-active, oil-soluble corrosion inhibitor which causes oil to wet metals preferentially, thus creating a film that protects the metal from the corrosive water phase. It widens and lowers the safe pH control range, lowers ammonia requirements and as a result reduces salt formation. Salts are washed from the system by detergent action, thus minimizing tube deposits. This increases heat exchange efficiency, resulting in savings which far exceed the normal inhibitor cost of 0.1 to 0.2 cents per barrel.

Extensive field tests and commercial use have proved that the **Unicor Corrosion Control Sytem** is an excellent way to protect crude units and other refinery equipment subject to internal corrosion. (Advertisement)

Review-Forecast Drilling by Counties

CALIFORNIA
Wildcat Completions by Counties

	Oil	Gas	Dry	Total	Footage
Alameda	0	0	4	4	22,372
Butte	0	0	3	3	10,038
Colusa	0	1	5	6	34,874
Fresno	2	0	28	30	193,115
Glenn	0	5	2	7	32,664
Humbolt	0	0	5	5	20,471
Kern	38	1	210	249	1,010,515
Kings	2	2	9	13	49,140
Los Angeles	10	1	63	74	430,294
Madera	0	3	8	11	44,719
Merced	0	0	7	7	41,206
Monterey	0	0	9	9	24,612
Orange	9	0	24	33	176,426
Riverside	0	0	2	2	3,545
Sacramento	0	1	10	11	54,790
San Benito	0	0	22	22	58,389
San Bernardino	0	0	4	4	7,380
San Diego	0	0	2	2	3,105
San Joaquin	0	0	5	5	27,186
San Luis Obispo	3	0	24	27	104,883
Santa Barbara	4	0	38	42	192,290
Santa Clara	0	0	4	4	16,588
Santa Cruz	0	0	2	2	5,565
Solano	0	2	6	8	37,710
Somano	0	0	1	1	7,167
Stanislaus	0	0	1	1	13,683
Sutter	0	0	10	10	45,222
Tehama	0	1	0	1	1,650
Tulare	1	0	11	12	16,770
Ventura	14	0	35	49	359,748
Yolo	0	2	10	12	68,998
Total	83	19	564	666	3,115,113

CALIFORNIA
Total Completions by Counties

	Oil	Gas	Dry	Total	Footage
Alameda	0	0	4	4	22,372
Butte	0	4	3	7	21,293
Colusa	0	1	5	6	34,874
Fresno	97	1	34	132	482,074
Glenn	0	7	3	10	49,028
Humbolt	1	0	5	6	22,281
Kern	757	7	265	1,029	3,557,899
Kings	4	3	10	17	71,482
Los Angeles	427	2	76	505	2,477,527
Madera	0	8	11	19	75,544
Merced	0	0	7	7	41,206
Monterey	47	0	9	56	129,269
Orange	165	0	32	197	1,005,654
Riverside	0	0	2	2	3,545
Sacramenton	0	5	10	15	73,355
San Benito	4	0	23	27	67,834
San Bernardino	0	0	5	5	7,727
San Diego	0	0	2	2	3,105
San Joaquin	0	0	5	5	27,186
San Luis Obispo	20	0	24	44	150,628
Santa Barbara	87	1	42	130	588,968
Santa Clara	0	0	4	4	16,588
Santa Cruz	0	0	2	2	5,565
Solano	0	2	6	8	37,710
Somano	0	0	1	1	7,167
Stanislaus	0	0	1	1	13,683
Sutter	0	1	10	11	51,772
Tehama	0	1	0	1	1,650
Tulare	1	1	12	14	20,070
Ventura	259	2	38	299	2,218,665
Yolo	0	2	10	12	68,998
Total	1,869	48	661	2,578	11,354,719

CALIFORNIA
Development Completions by Counties

	Oil	Gas	Dry	Total	Footage
Butte	0	4	0	4	11,255
Fresno	95	1	6	102	288,959
Glenn	0	2	1	3	16,364
Humbolt	1	0	0	1	1,810
Kern	719	6	55	780	2,547,384
Kings	2	1	1	4	22,342
Los Angeles	417	1	13	431	2,047,233
Madera	0	5	3	8	30,825
Monterey	47	0	0	47	104,657
Orange	156	0	8	164	829,228
Sacramento	0	4	0	4	18,565
San Benito	4	0	1	5	9,445
San Bernardino	0	0	1	1	347
San Luis Obispo	17	0	0	17	45,745
Santa Barbara	83	1	4	88	396,678
Sutter	0	1	0	1	6,550
Tulare	0	1	1	2	3,300
Ventura	245	2	3	250	1,858,917
Total	*1,786	29	97	1,912	8,239,604

*Includes 4 condensate wells.

Part 6 of 7 Parts

Underground Corrosion

CORROSION CONTROL

New Techniques in Control

by O. C. Mudd

THIS series started in Journal issue of November 30, 1953, and installments have appeared at regular intervals since that time.

The author believes that better pipe-line coatings are needed and cited tests to illustrate his point in the last installment (issue of January 11). Results of additional tests are pointed out here.

Test results showing rates of coating deformation at different temperatures under a stress below that causing fracture are illustrated in Fig. 12.

Coatings with some degree of resilience show no tendency to check or disbond unless the temperature is lowered to a point where resiliency disappears.

The cost of any new coating must be competitive with those in current use or acceptance will be slow and if accepted at higher cost it will be only after experience demonstrates a fair return from an increased investment.

Application should follow conventional or more simple methods if favorable acceptance is to be gained.

Trench Preparation

Applied coating contributes an appreciable part to new-line construction costs and serves primarily in protecting the larger investment in pipe plus assuring better operating continuity. It appears only reasonable to prevent avoidable coating damage when such preventive measures add only a fraction of the coating cost.

If cathodic protection is applied, this additional cost in preventing coating damage reduces the number of installations required, lowers the cost of electrical power and minimizes soil-potential gradients that adversely affects other structures necessitating current drainage bonds.

A coating, just following application, may be good but often suffers damage in subsequent handling or when lowered in to a poorly prepared trench.

Coating damage during the lowering-in operation can be minimized by relatively simple methods. It is essential to maintain full trench width free of side-wall projections and clear debris from the trench bottom that may cause coating damage.

Portable guard boards of plywood placed along jagged trench walls when lowering in helps to avoid damage. Long-handled garden rakes in the hands of properly instructed workers have been effective in removing potential-damage objects from the trench bottom during lowering operations.

A 15-ft. section of pipe, slightly larger than the coated pipe to be laid, pulled along the trench bottom just prior to lowering the pipe will help reduce bottom-side coating damage.

This pipe "trench-bottom shaper" or "mole" serves to round out the trench bottom thus increasing the coated-pipe support area, also pushing hard objects away or rotating sharp edges away and moves excess dirt from high points to low ones thereby eliminating many pressure points or areas against the coating that would exist. This procedure is illustrated in Fig. 13.

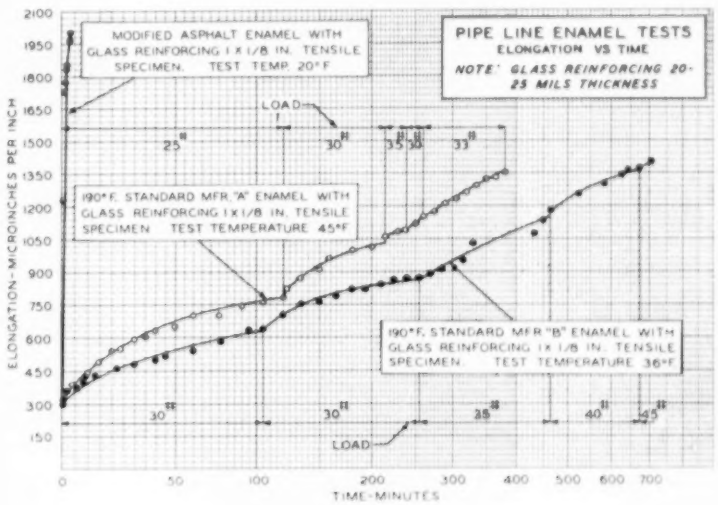

PIPE LINE ENAMEL TESTS
ELONGATION VS TIME
NOTE: GLASS REINFORCING 20-25 MILS THICKNESS
MODIFIED ASPHALT ENAMEL WITH GLASS REINFORCING 1 X 1/8 IN. TENSILE SPECIMEN. TEST TEMP. 20°F
190°F. STANDARD MFR."A" ENAMEL WITH GLASS REINFORCING 1 X 1/8 IN. TENSILE SPECIMEN TEST TEMPERATURE 45°F
190°F. STANDARD MFR."B" ENAMEL WITH GLASS REINFORCING 1 X 1/8 IN. TENSILE SPECIMEN TEST TEMPERATURE 36°F
LOAD
ELONGATION - MICRONINCHES PER INCH
TIME-MINUTES

Fig. 12.

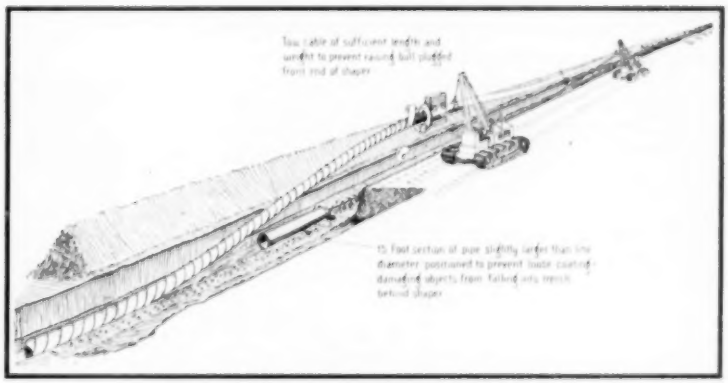


Fig. 13—Pipe mole rounds out trench bottom.

Author is senior corrosion engineer, Shell Pipe Line Corp., Houston. Paper presented before session on transportation, annual A.P.I. meeting, Chicago, November 10, 1953.

YOUR POCKETBOOK WILL TELL YOU

ALCOA belongs

ALUMINUM HEAT EXCHANGER TUBES SAVE UP TO 80%

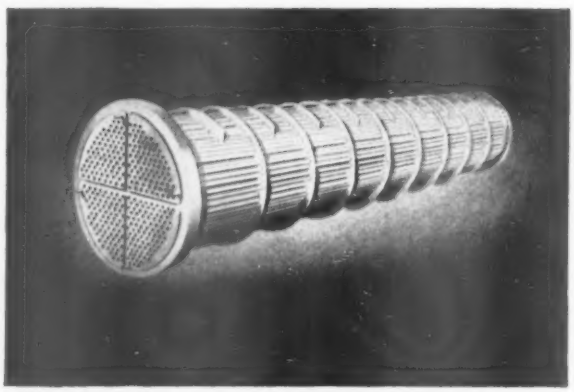
Alcoa Aluminum Tubes cost far less than other metal tubes . . . 1/2 the price of Admiralty, 2/3 the price of Mild Steel, 1/5 the cost of Stainless!

An average-sized refinery can save $50,000 in first cost by using Alcoa Aluminum Tubes (figured on 20,000 tubes) as this chart shows:

PRICE PER 16 FOOT LONG TUBE

	⅝" O.D. x .049" wall	¾" O.D. x .049" wall	¾" O.D. x .065" wall	1" O.D. x .065" wall
3S-H14	$1.31	$1.50	$1.82	$2.37
Alclad (inside) 3S-H14	1.66	1.92	2.28	3.02
Seamless Mild Steel	2.68	2.82	3.18	3.49
Admiralty Brass	3.31	3.94	5.00	6.68
Cupro Nickel (30%)	4.87	5.71	7.46	10.03
Stainless Steel (304)	8.61	9.67	11.38	13.73

NOTE: *All prices are approximate. Prices for 3S-H14 and Alclad 3S-H14 based on lots of 2000-4999 lbs., for Admiralty and Cupro Nickel 5000 to 9999 lbs. Prices for Mild Steel and Stainless based on lots of 10,000 ft. with exception of size 1" O.D. x .065" wall which is based on 5000 ft.*



Further savings in handling and shipping, as well as excellent low temperature properties and resistance to corrosion—make Alcoa tubes the best buy, by far, for many heat exchanger applications.

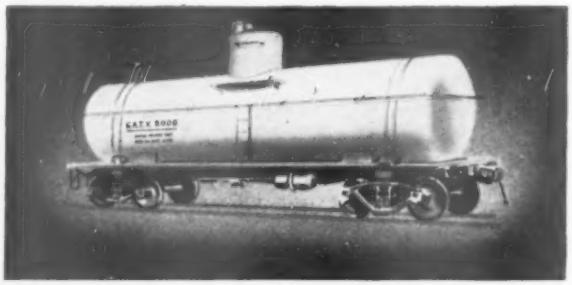
Let us tell you more about the unusual savings you can make with Alcoa tubes. Write for the *free* booklet, *Alcoa Aluminum Heat Exchanger Tubes.*

ALUMINUM TANK CARS SAVE UP TO 33⅓%

Tank cars made of Alcoa Aluminum cost one-third *less* than stainless steel tank cars—savings well worth your investigation!

Aluminum does not contaminate or discolor sensitive liquids—does not promote decomposition. Result: *no damage to ladings, better end products.* Aluminum is highly resistant to most corrosive ladings—requires far less maintenance than other metals.

Alcoa pioneered the aluminum tank car more than 25 years ago . . . and that original car is still hauling fatty acids. *There's* proof that aluminum resists corrosion, gives lasting service, doesn't contaminate its cargo. If you want further proof, ask your car builder about the advantages of lightweight aluminum rolling stock. Or better still, write Alcoa. We have gathered facts and figures on literally hundreds of liquid ladings that can be safely, economically shipped in aluminum. Ask us about *your* commodity today.



ALUMINUM
in processing

ALUMINUM COILED TUBE SAVES UP TO 40%

ALCOA UTILITUBE* is aluminum coiled tube made of a specially selected alloy to provide low cost, easy workability and high fatigue strength.

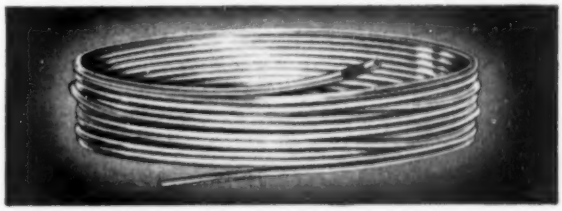
Alcoa Utilitube offers savings up to 40 per cent over copper . . . has excellent on-the-job forming and flaring properties. It is available in economical, long lengths up to 1,000 feet or more, depending on size. It stands up well under vibration . . . has high resistance to most industrial atmospheres and to many liquids and gases.

*Registered Trademark, Aluminum Company of America

Use Alcoa Utilitube for:

- PNEUMATIC CONTROL CIRCUITS.
- GASOLINE AND FUEL OIL FOR INTERNAL COMBUSTION ENGINES.
- LUBRICATING OILS FOR ENGINES AND MACHINES.
- FLUIDS FOR HYDRAULIC SYSTEMS.

For complete details, write for the booklet, *Alcoa Utilitube.*

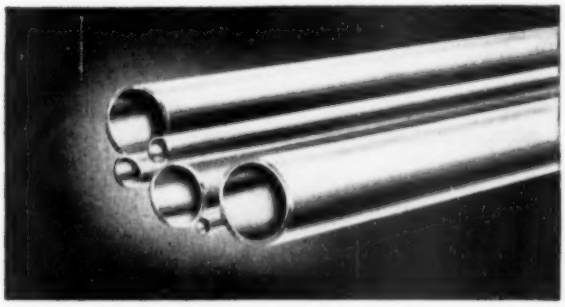


ALUMINUM PIPE IS THE LOWEST COST CORROSION-RESISTANT METAL PIPE.

Alcoa Aluminum Pipe and Fittings offer tremendous advantages to the chemical, petroleum and food processing fields. It is equally applicable for oil, gas, water, compressed air and mine drainage pipe lines. Structural uses, too, have become increasingly popular, especially in outdoor areas subject to corrosive fumes or salt spray.

Aluminum pipe, of course, is highly resistant to attack by hydrogen sulfide in sour crude and most other sulphur compounds . . . protects the quality of high-grade resins and other naval stores. It can be joined by every fusion process . . . is easier to handle and install because it only weighs 1/3 as much as other metal pipe. Its chemical inertness and corrosion resistance avoid batch and process contamination. High thermal conductivity and ductility speed filling of vessels with cold liquids.

You get all these cost-cutting qualities when you use Alcoa Pipe in the processing field. Write for the booklet, *Alcoa Aluminum Pipe and Fittings.*



For process chemicals, catalysts, catalyst carriers and desiccants, investigate Alcoa Chemicals.

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA

ALUMINUM COMPANY OF AMERICA
904-A Alcoa Building, Pittsburgh 19, Pa.

I would like more information on:

☐ Alcoa Heat Exchanger Tubes ☐ Alcoa Utilitube
☐ Alcoa Aluminum for Tank Cars ☐ Alcoa Aluminum Pipe
☐ Alcoa Chemicals

NAME _____

TITLE _____

COMPANY _____

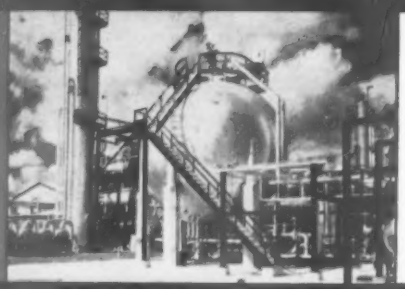
ADDRESS _____

TO INCREASE REFINING EFFICIENCY

PETRECO

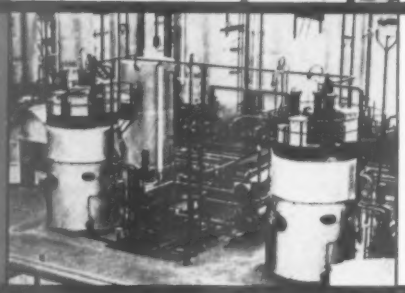
ELECTRIC PROCESSING

DESALTING



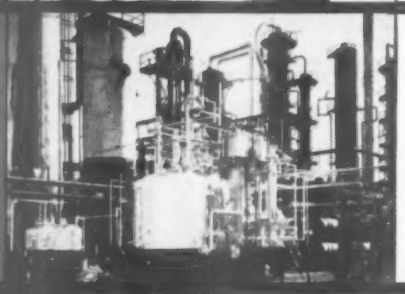
Petreco *Electric* Desalting eliminates salts, solids, and other impurities with such a high degree of efficiency that salt difficulties are eliminated – *enabling refiners to run more crude.*

LUBE OIL TREATING



Petreco Lube Oil Treating is an automatic, continuous method for acid-treating lube oils and similar stocks. It is carried on in a closed system, under pressure. High efficiency acid contacting results in minimum acid usage, negligible oil entrainment in sludge, and maximum product quality.

DISTILLATE TREATING



Petreco *Electric* Distillate Treating takes the guesswork out of distillate treating. It is applicable to acid, alkali or doctor treating all distillate stocks. It permits continuous, automatically controlled treating with minimum equipment, handling and attention.

DESAPONIFICATION

Where caustic is added to crude prior to distillation, ash-forming materials resulting from such caustic are often present in fuel stocks. Petreco *Electric* Desaponification removes about 85% of such ash-forming constituents, enabling fuel stock to be marketed or used as a cracking charge.

For complete information, call or write

PETROLITE CORPORATION

PETRECO DIVISION

3202 South Wayside Drive, Houston 1, Texas

1390 E. Burnett Street, Long Beach 6, California

PETRECO

ELECTRIC PETROLEUM PROCESSING

CRUDE OILS: REMOVAL OF SALTS, SOLIDS, OTHER IMPURITIES; DEHYDRATING

LUBE OILS: CONTINUOUS, AUTOMATIC ACID-TREATING

DISTILLATES: ACID TREATING; CAUSTIC TREATING; DOCTOR TREATING

FUEL OILS: DESAPONIFICATION, ASH REMOVAL

PC 53-3

NO LEAK-NO CREEP

thats why operators use

LANE WELLS COMPANY

Drillable-Wireline

BRIDGING PLUGS

Against pressures either up or down, the big interlocking slips (A) hold a Lane-Wells Plug right where you set it—*without damaging the casing*—and the extra-length sealing element (B) packs off *fluid-tight*, even against flowing gas or fluid under pressure.

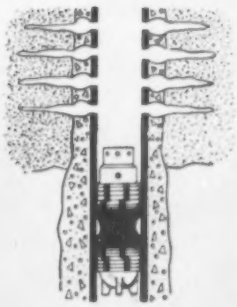
Lane-Wells Plugs run in on wireline, run fast through fluid, hold as long as you want 'em to, yet drill out quickly with either rotary or cable tools.

MAGNESIUM PLUG is rated to hold against differential pressures up to 6,000 p.s.i., and drills out in 1 to 3 hours.

CAST IRON PLUG is rated to 10,000 p.s.i., outlasts the casing in permanent installations, yet drills out in 4 to 6 hours.

Tomorrow's Tools—Today!

Here's a Proved Application of Lane-Wells Drillable Bridging Plugs



In UPPER ZONE TESTING and COMPLETION, the plug gives complete protection to the lower zone. Pea gravel or cement may be placed on top of the plug if desired. The plug may be left in place to form a new bottom, if the lower zone is not to be produced, or the plug may be drilled out for dual completion.

AU-701

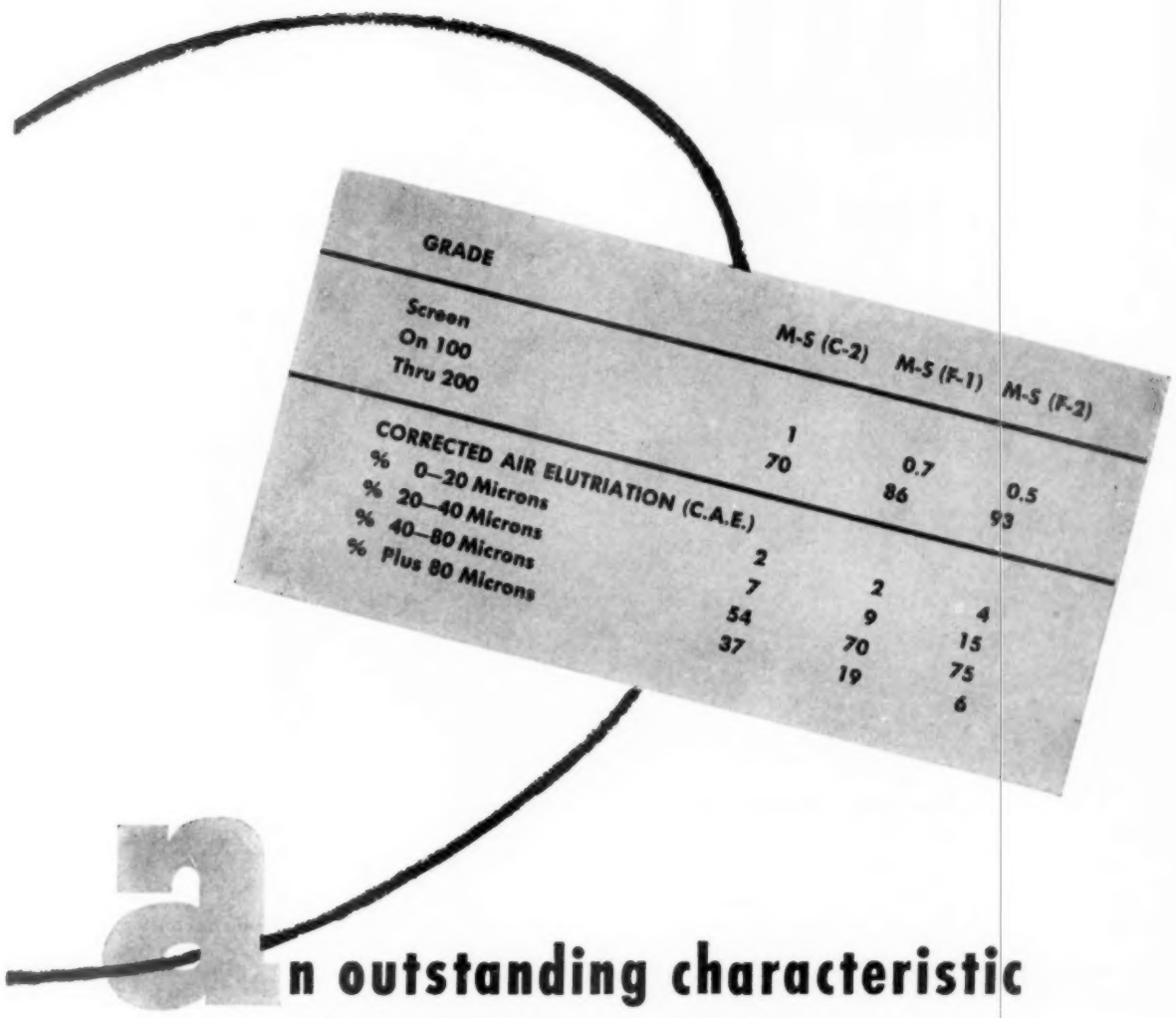
LANE-WELLS General Offices, Export Office, Plant • 5610 So. Soto St., Los Angeles 58

LOS ANGELES • HOUSTON • OKLAHOMA CITY • LANE-WELLS CANADIAN CO. IN CANADA • PETRO-TECH SERVICE CO. IN VENEZUELA

How much of your active catalyst is lost because of particle size?

How many of your difficulties can be attributed to coarse catalyst?

Progress Through Chemistry
THE DAVISON CHEMICAL CORPORATION
BALTIMORE 3, MARYLAND
PRODUCERS OF: CATALYSTS, INORGANIC ACIDS, SUPERPHOSPHATES,
PHOSPHATE ROCK, SILICA GELS AND SILICOFLUORIDES
SOLE PRODUCERS OF DAVCO GRANULATED FERTILIZERS



GRADE	M-S (C-2)	M-S (F-1)	M-S (F-2)
Screen			
On 100	1		
Thru 200	70	0.7	0.5
		86	93
CORRECTED AIR ELUTRIATION (C.A.E.)			
% 0–20 Microns	2		
% 20–40 Microns	7	2	
% 40–80 Microns	54	9	4
% Plus 80 Microns	37	70	15
		19	75
			6

an outstanding characteristic of DAVISON'S M-S® catalysts

are their narrow range of particle size distribution. There is a minimum of fines—a minimum of coarse. This is important to you!

The fines in your fresh active catalyst may be lost because the unit is unable to retain them. Coarse catalyst has an adverse effect on catalyst circulation . . . bed density . . . regeneration . . . fluidization.

Here are typical production analyses of Davison M-S Catalysts. One of these grades should fit into your operations. For help in selecting your catalyst or other information call your Davison Field Service Engineer or write.

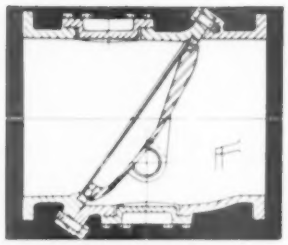
QUIET

Do Not Disturb Pipelines

You hang this sign on every line, when you install Chapman Tilting Disc Check Valves. For these unique check valves don't slam or hammer, under usual piping arrangements. And that means no damage to pipeline joints . . . virtually no wear in the valve itself.

Cross section at the right shows you how the airfoil design of the disc makes these valves *keep quiet* all their working lives . . . shows you why, in any installation, head loss is reduced over regular swing-type checks. Send for Publication No. 30, showing charts of test-results at leading engineering laboratories. Write today.

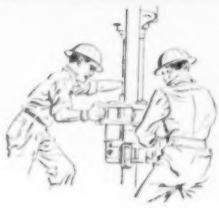
The Chapman Valve Manufacturing Co.
INDIAN ORCHARD, MASSACHUSETTS



Here's why
CHAPMAN Tilting Disc Check Valves
***Keep Quiet* All Their Lives**

This specially designed "airfoil" disc balances perfectly in open position . . . then drops easily to closed position (cushioned by the flow). No jarring or slamming, in usual pipe-layouts. Write for bulletin.

CHAPMAN (TILTING DISC) **CHECK VALVES**



Oil powers its progress . . . your bank helps you produce it!

Oil lies buried under one . . . two . . . three miles of dirt and rock. Finding it — recovering it — is a job for men of courage and skill — oilmen — with the will to work and the right to profit.

It is also a job for money. Lots of it. And hundreds of millions of dollars of it have come from our bank. It is supplied by our depositors — and by our stockholders who provide our capital and surplus of $50,000,000.00, giving us the highest lending limit of any bank in the South.

Years ago the Republic pioneered the first oil production loans by commercial banks. Since then our bank has made so many oil loans — in every oil-producing state in the nation — that oil men call us "The Oil Bank."

We like that name. It tells the story of Republic's leadership in working for this dynamic industry. It tells, too, of the many ways our bank works for *you* — for every oilman!

Oil is America's fortune. It means better living — bigger business for every American. We're glad your bank has a hand in it.

Fred B. Florence
PRESIDENT

REPUBLIC NATIONAL BANK OF DALLAS

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

Capital and Surplus $50,000,000.00 — Largest in the South

"Tube up and forget it" with leakproof Parker *Triple-lok* Fittings

Cramped and crowded, nobody likes to do this kind of a job over again. That's why trouble-free Parker *Triple-lok* fittings were used. Since this hydraulic test stand was completed, it has run over a billion impulse cycles at 3000 psi. without a single leak at any *Triple-lok* fitting.

These flare fittings are absolutely leakproof even under the severest conditions of vibration, high pressures and temperatures. Thousands of destruction tests prove that they will hold pressures that burst the tubing. And, they remain leakproof no matter how often you reassemble them!

Using *Triple-lok* fittings is also the easiest and fastest way to tube up your system even in close quarters. Flared tubing simplifies installation. For fitting make-up, you need only a small wrench because assembly torque is so low.

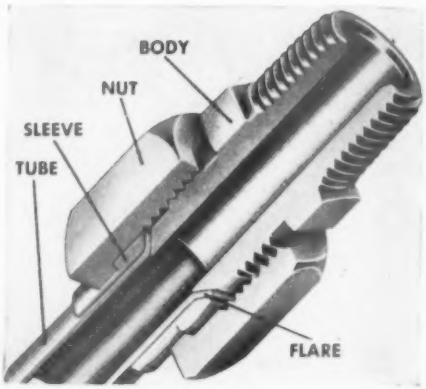
These fittings meet J.I.C. and S.A.E. standards plus specifications of the A.S.M.E. Code for Pressure Piping.

As a matter of fact, *Triple-lok* is the standard of industry. More *Triple-lok* fittings are used on industrial machinery than any other fitting.

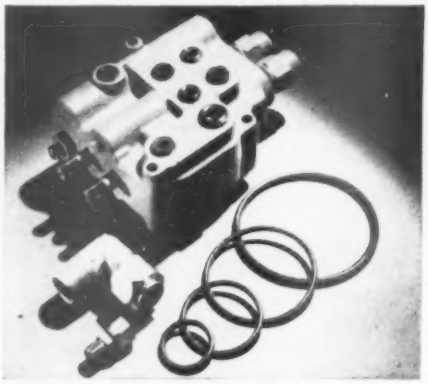
So, tube up and forget it. Use *Triple-lok* throughout your plant. Parker offers the widest range of shapes and sizes available . . . for tubing outside diameters from ⅛ through 2 inches. Ask your distributor for Catalog No. 4300.

TUBE AND HOSE FITTINGS DIVISION
The Parker Appliance Company
Section 404R, 17325 Euclid Avenue, Cleveland 12, Ohio

Parker
Hydraulic and fluid system components



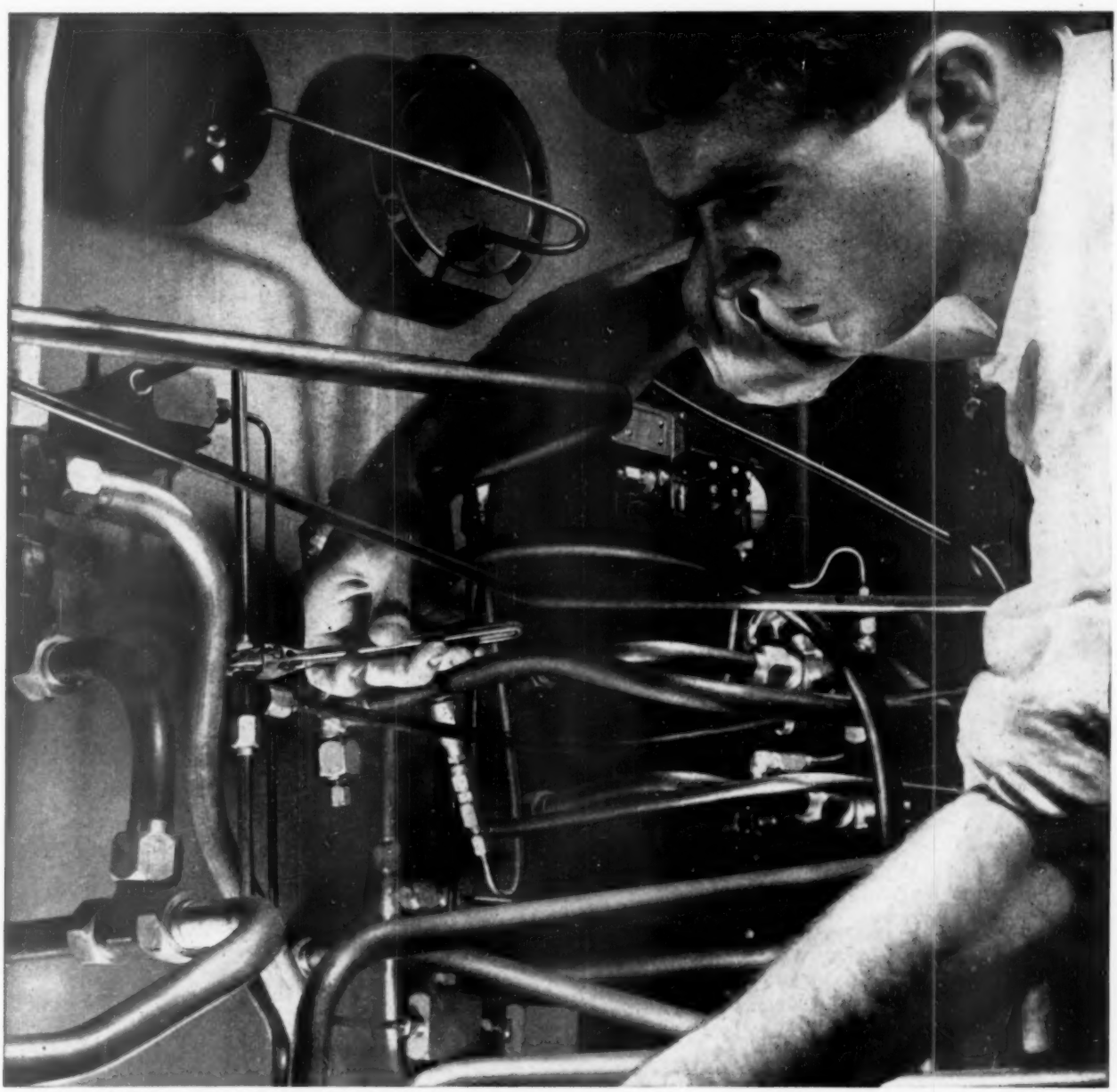
3-piece Triple-lok fittings are stocked in steel, stainless steel, brass, and aluminum alloy —available in other materials on special order.



What other Parker products interest you? Ferulok flareless fittings? Hydraulic control valves? O-rings? Write Parker for information.

CALL YOUR NEAREST DISTRIBUTOR FOR PARKER INDUSTRIAL FITTINGS

Akron 9, Ohio	B. W. Rogers Co. 850 South High St.
Baltimore 13, Md.	Carey Machinery & Supply Co. 3501 Brehms Lane
Baltimore 5, Md.	Whitehead Metal Products Co. 4300 E. Monument St.
Beaumont, Tex.	Standard Brass & Mfg. Co. 705 Milam St.
Birmingham, Ala.	Mill & Textile Supply, Inc. 3128 Third Ave. South
Boston 15, Mass.	A. E. Borden Co., Inc. 175 Brookline Ave.
Bryson City, N. C.	Wallace Co. of N. C. P. O. Box 572
Buffalo 7, N. Y.	Whitehead Metal Products Co. 2128 Elmwood Ave.
Cambridge 39, Mass.	Whitehead Metal Products Co. 281 Albany St.
Cedar Rapids, Ia.	Globe Machinery & Supply Co. 309 8th Ave. S. E.
Charleston, W. Va.	Persingers, Inc. 514 Elizabeth St.
Charlotte 1, N. C.	Industrial Piping Supply Co. 1501 Dowd Rd.
Chicago 14, Ill.	Wallace Tube Co. 1300 Diversey Parkway
Cincinnati 29, Ohio	Williams & Co. 3231 Fredonia Ave.
Cleveland 14, Ohio	B. W. Rogers Co. 1279 East 12th
Cleveland 14, Ohio	Williams & Co. 3700 Perkins Ave.
Columbus 8, Ohio	Williams & Co. 851 Williams Ave.
Dallas 9, Tex.	Metal Goods Corp. 6211 Cedar Springs Rd.
Davenport, Ia.	Globe Machinery & Supply Co. 410 E. Second St.
Dayton 10, Ohio	J. N. Fauver Co. 1534 Keystone Ave.
Denver 2, Colo.	Metal Goods Corp. 2425 Walnut St.
Des Moines 6, Ia.	Globe Machinery & Supply Co. East First & Court Ave.
Detroit 1, Mich.	J. N. Fauver Co. 49 West Hancock St.
Harrison, N. J.	Whitehead Metal Products Co. 1000 South Fourth Ave.
Houston 3, Tex.	Metal Goods Corp. 711 Milby St.
Houston 1, Tex.	Standard Brass & Mfg. Co. 2018 Franklin St.



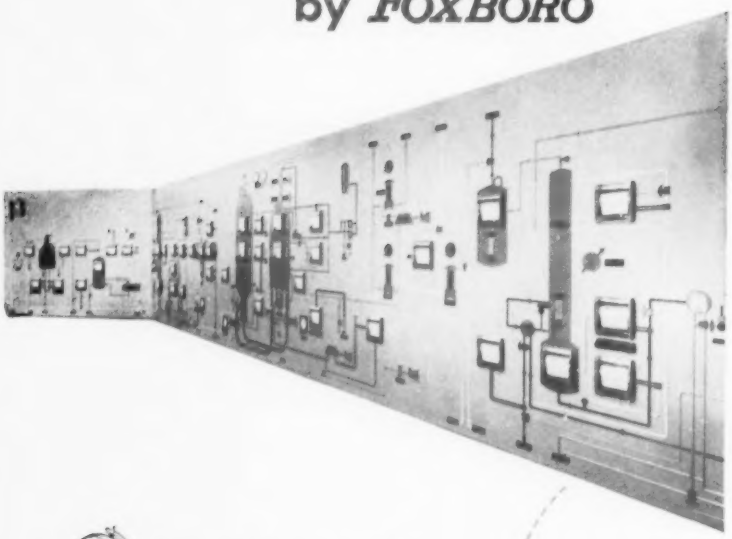
Easiest way to install tubing, even in cramped quarters, is to use Parker *Triple-lok* flare fittings. Assembly torque is so low that you need only a small wrench for fitting make-up. The self-aligning sleeve acts as a lock washer, supports the tube, and damps vibration. *Triple-lok* is absolutely leakproof even under high pressures and temperatures.

Indianapolis, Ind.	Avels Sales & Engineering Co. 16 W. 22nd St.	**New Orleans 12, La.**	Metal Goods Corp. 432 Julia St.	**Salt Lake City 4, Utah**	Pace-Turpin & Co. 726 South Third West
Jacksonville, Fla.	Florida Metals, Inc. 2937 Strickland St.	**Newport News, Va.**	Noland Company 27th St. & Virginia Ave.	**San Francisco 3, Cal.**	General Machinery & Supply Co. 1346 Folsom St.
Kansas City 16, Mo.	Metal Goods Corp. 1300 Burlington Ave.	**New York, N. Y.**	Nielsen Hydraulic Equipment, Inc. 5 Penn Place, Pelham Manor 65	**Seattle 9, Wash.**	Palmer Supply Co. 222 Westlake North
Knoxville 5, Tenn.	Leinart Engineering Co. 412 E. 5th Ave.	**New York 14, N. Y.**	Whitehead Metal Products Co. 303 W. 10th St.	**Shreveport, La.**	Standard Brass & Mfg. Co. 1557 Texas Ave.
Los Angeles, Cal.	Haskel Engineering & Supply 721 Broadway, Glendale 4	**Odessa, Tex.**	Snyder Co., Inc. 2604 Kermit Highway	**St. Louis 15, Mo.**	Metal Goods Corp. 5239 Brown Ave.
Los Angeles 12, Cal.	Metropolitan Supply Co. 353 E. 2nd St.	**Philadelphia, Pa.**	Louis H. Hein Co. 15 W. Lancaster Ave., Ardmore	**Syracuse 4, N. Y.**	Whitehead Metal Products Co. 207 W. Taylor St.
Memphis, Tenn.	J. E. Dilworth Co. 730 South Third St.	**Philadelphia 40, Pa.**	Whitehead Metal Products Co. 1955 Hunting Park Ave.	**Tampa, Fla.**	Florida Metals, Inc. 222 N. 12th St.
Miami, Fla.	Florida Metals, Inc. 4100 N. W. 37th Ct. Hialeah	**Pittsburgh 33, Pa.**	Williams & Co. 901 Pennsylvania Ave.	**Toledo 2, Ohio**	Williams & Co. 650 E. Woodruff Ave.
Milwaukee 3, Wis.	Morman Belting & Supply Co. 522 W. State St.	**Portland 10, Ore.**	Hydraulic Power Equipment Co. 2316 N. W. Savier St.	**Tulsa, Okla.**	Ardun Supply Co. 303 S. Frankfort
Milwaukee 4, Wis.	Wallace Companies of Wisconsin, Inc. 838 South 6th St.	**Roanoke 10, Va.**	Noland Company 1226 Center Ave. N. W.	**Tulsa 3, Okla.**	Metal Goods Corp. 302 N. Boston
Minneapolis 15, Minn.	Vincent Brass & Copper Co. 124 Twelfth Ave. South	**Rockford, Ill.**	Rockford Tool & Transmission Co. 802 Broadway	**Export**	Mercator Corp. 438 Walnut St., Reading, Pa., U.S.A.

Follow the Leaders . . . specify

GRAPHIC PANELS

by FOXBORO



COMBINATION UNIT CONTROL PANEL for a Standard Oil Company (New Jersey) Affiliate. The panel makes full use of compact, full-visibility Foxboro Consotrol Recorders and Recording Control Stations located in the process diagram for easy operation and trend analysis.

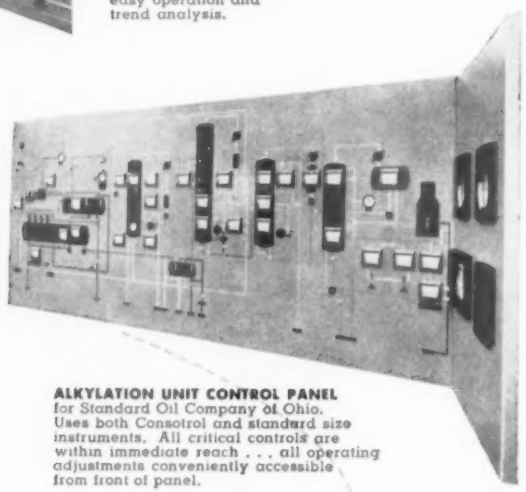
Here and abroad, leading manufacturers are saving time and money by utilizing Foxboro's expert panel engineering facilities to provide them with Graphic Panels of outstanding efficiency and appearance.

Specialists in the field, Foxboro will engineer and fabricate a Graphic Panel exactly to your specifications —or will design one directly from your flow sheet. And they will recommend the most practical instrumentation and arrangement.

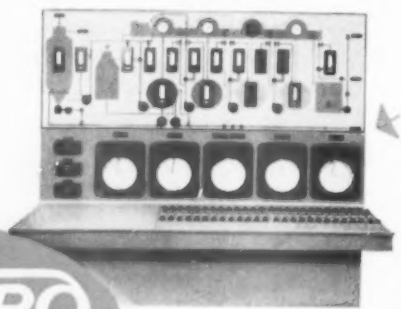
The Graphic Panels shown here are typical of the many now in operation throughout the world.

Write for detailed information on Foxboro Graphic Panels; also Bulletin 471 on Consotrol Instrumentation.

The Foxboro Company
601 Neponset Ave., Foxboro, Mass.



ALKYLATION UNIT CONTROL PANEL for Standard Oil Company of Ohio. Uses both Consotrol and standard size instruments. All critical controls are within immediate reach . . . all operating adjustments conveniently accessible from front of panel.



GRAPHIC PANEL for Gaylord Container Corp. controls four-stage vacuum pulp washer. Indicating type control instruments are located in the process diagram. Operation records appear on pneumatic 6-point Circular Chart Recorders located below related instruments in diagram. Normal and emergency operating controls and signal lights are neatly arranged on panel desk for easy identification.

FOXBORO
Reg. U. S. Pat. Off.
PROCESS CONTROL ENGINEERING

Our house? Built with wire rope?

Not only yours, Mr. Brown, but millions of others too.

A miracle of the postwar years has been the construction of more than 7-million new dwelling units. Accomplishment of this tremendous task has called for "muscles of steel"—rugged wire rope that is a vital factor in mining the ore, quarrying the stone and bringing out the timber that comprise the basic components of every house and building—large or small.

Supplying these "muscles of steel" to the giant that is American industry is our big job here at Wickwire—a job we've been doing well for over half a century.

In the mines . . . the quarries . . . the logging camps—and wherever wire rope is used, they'll tell you that for utmost safety, longer life and most economical service you can always count on the quality and strength that is built into Wickwire Rope.

A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Denver
Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland
Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga
Chicago • Detroit • Emlenton (Pa.) • New Orleans • New York • Philadelphia

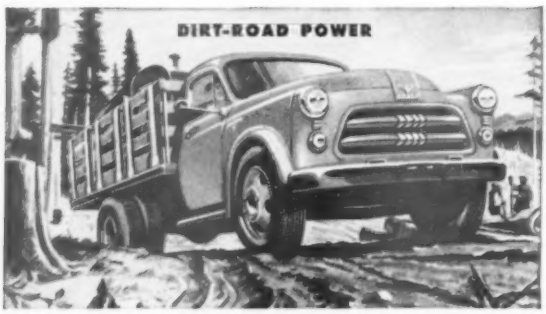
WICKWIRE ROPE

CFI PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

10/3

New Dodge "Job-Rated" Trucks...

New! Spectacular low-built lines with pick-up and panel floors as low as 22½ inches from the ground . . . knee-high for loading ease! Lower running boards for easier entry! Lower hood for greater visibility!



New! Great V-8's and thrifty 6's including the most powerful V-8's of all leading trucks . . . with revolutionary hemispherical combustion chamber! Available in 1½-, 2-, 2½-ton . . . standard on 2¾-, 3, 3½-ton!

with new low work-saving design...

New Steering system means easier handling . . . keeps Dodge ahead of the field with sharpest turning of any comparable trucks. More slant to steering wheel post. New power steering available in 4-ton models!

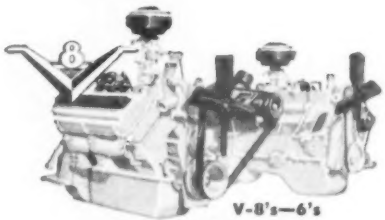
New! Full-vision luxury cabs with big one-piece windshield! More vision area than in any other leading make! New easy-chair seats! New cab sealing against dust, drafts! New two-tone interior styling!

help reduce your trucking costs!

New! Over 75 features! New, low, work-saving, time-saving design! New payload increases! New cab heating and ventilation! New styling from road to roof! New value leader models! New shorter conventional tractors, only 102 inches from front bumper to rear of the cab. New easy-shifting transmissions!

Free book on power! Explains the 3 basic kinds of engine efficiency . . . tells what they mean to you in power and economy! Get your free copy at your friendly Dodge dealer's! See him today!

New! Even greater values...yet still priced with the lowest!



V-8's—6's

2 great engine line-ups!

SEE YOUR FRIENDLY DODGE DEALER

NEW DODGE "Job-Rated" TRUCKS

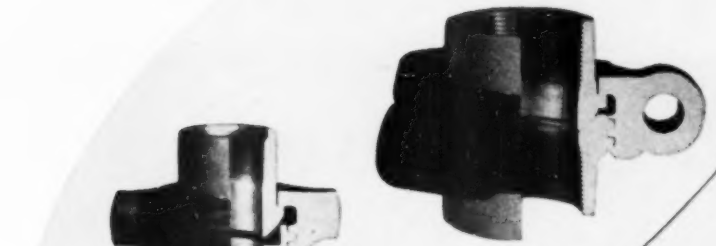


FIG. 100
1000 p.s.i.
SIZES 2", 2½", 3", 4", 6", 8"

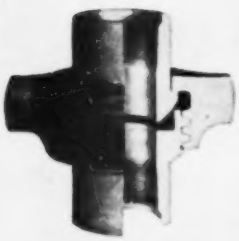


FIG. 600
6000 p.s.i.
SIZES: 1", 1½", 2", 2½", 3", 4"

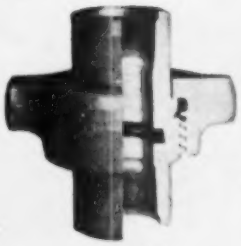


FIG. 1502
15,000 p.s.i.
SIZES: 2", 2½", 3"

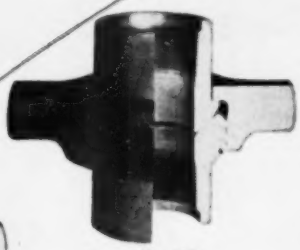


FIG. 400
4000 p.s.i.
SIZES: 2", 2½", 3", 4", 5½" O.D., 6", 7" O.D., 8", 10"

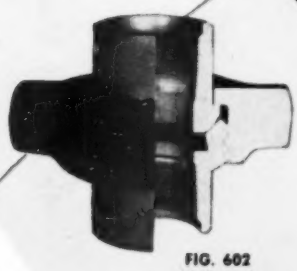


FIG. 602
6000 p.s.i.
SIZES: 1", 1½", 2", 3", 4"

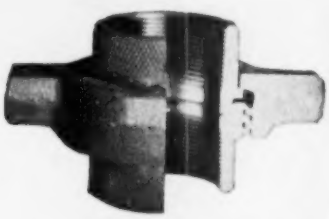


FIG. 200
2000 p.s.i.
SIZES: 1", 1¼", 1½", 2", 2½" 3", 4", 6", 8"

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. . . AND THEY'RE AVAILABLE EVERYWHERE!

It's no wonder WECO Unions are the most popular and widely used by the oil industry. The wide range of types, pressures (1,000 - 15,000 lb.) and sizes (1" through 10") means you can get the right WECO Union wherever they're needed on your drilling rig — your production hook-ups — tank and separator manifolds — field gathering lines, and every other service in the oil field. There are WECO Unions for pump suction line connections, a blanking union for scraper box and jumper assembly service, manifolding, terminal installations and transfer lines.

Every union has the six basic factors of design and manufacture which make "WECO — the Unions you can trust for sealing and service" — SELECTED RAW MATERIALS — ADVANCED MANUFACTURING PRACTICES — BALL AND CONE SEAT — RUGGED ACME THREADS — HEAVIER WALL SECTIONS — PRECISION SEATING SURFACES.

And what's more, you can get your WECO Unions from supply stores everywhere — that's why "It's Wise to Standardize with WECO."

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REGISTERED TRADE MARK
UNIONS

It's Wise to Standardize with . . . WECO . . .

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Division of Chiksan Company
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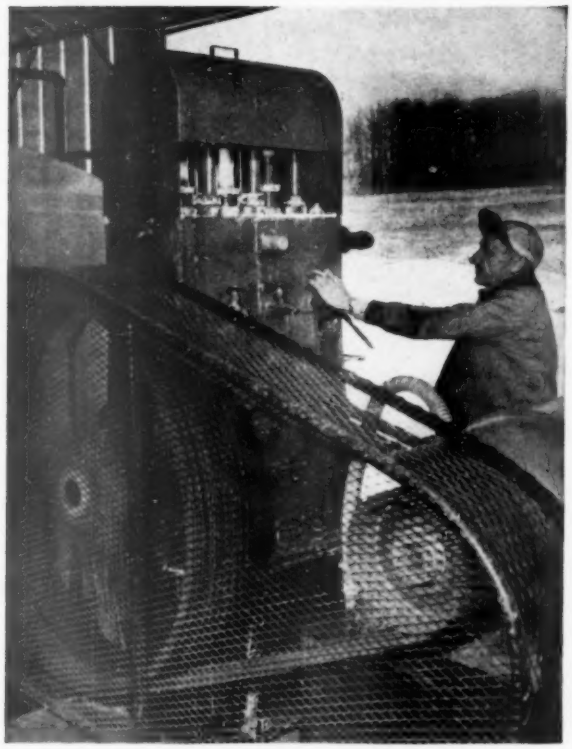


QUICK SHEAVE CHANGES for maintenance of this water flooding equipment are easy when the QD is used. The hub stays put, permanently aligned and only the rim comes off when the heavy assembly bolts are used as jack screws. Re-assembly is just as easy.

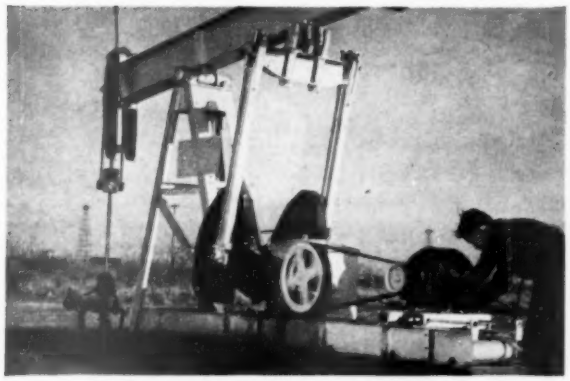
Drilling, waterflooding pumping...the efficiency of all three may depend on the sheave you choose!

Only Worthington's exclusive QD design meets every oil field requirement

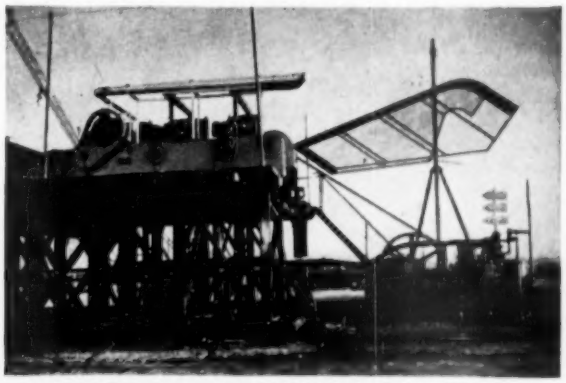
Whether it's easy maintenance, speed in assembly, or just smooth operation you're looking for, you'll get it with Worthington's QD Sheaves.

Their unique two-piece construction makes them easy to get on, easy to get off. Yet the heavy-duty taper cone friction grip hugs the shaft tight against even the heaviest shock loads.

That's why it will pay you to standardize on Worthington QD's for every oil field job. Write Worthington Corporation, Oil City, Pennsylvania.



INDIVIDUALLY DESIGNED FOR THE LOAD it has to carry, the QD sheave on this pumping job will probably outlast the equipment with which it is used. Worthington first built the famous QD to the specifications of oil production men. It's now accepted as *standard* for all kinds of duty.



THE EXTRA GRIPPING ABILITY of the QD sheave is especially important on drilling rigs like this. Its tapered cone friction grip withstands heavy shock loads without slipping. Servicing rigs like this is easier, too, because the QD can be mounted and dismounted faster.

MV.3.7

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BUY THESE WORTHINGTON STANDARD PRODUCTS FROM YOUR LOCAL DISTRIBUTOR

Compressors • Pumps • Multi-V-Drives • Variable Speed Drives

Six Reasons Why

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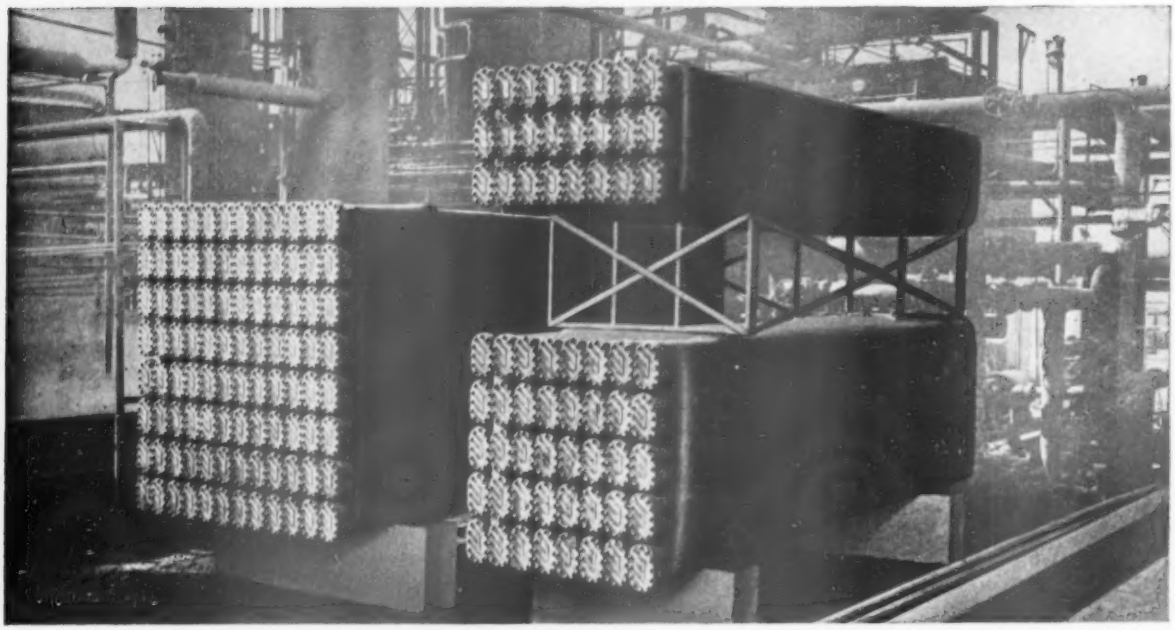


BROWN FINTUBE *Sectional* HEAT EXCHANGERS

FLEXIBILITY: If plant requirements change — and this is not uncommon — a "bank" of Brown Fintube heat exchanger sections can be disconnected and reassembled in different series-parallel arrangement easily and on short notice. "Bundle type" exchangers are not flexible. For them a change in duty usually involves designing — and waiting — for a whole new unit.

NO OBSOLESCENCE: Brown Fintube Sections never become obsolete. They can be used in one exchanger after another. Sections not in use serve as "standby" or parts, for other sections on stream.

REDUCED FOULING: Brown Fintube sections transfer more heat per lineal foot at lower surface temperatures. This minimizes coking. Also the longitudinal passages control the material flow eliminating eddies and reducing fouling.

EASY CLEANING: reduces maintenance costs. By manifolding just one extra parallel stream into an exchanger, the entire unit can be operated continuously — always clean — without ever coming off stream.

REDUCED STORES: Avoids tying up thousands of dollars in spare parts, housing and handling them.

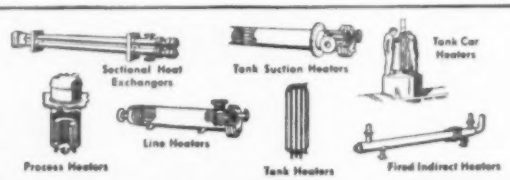
PROMPT DELIVERY: Standardization permits economical assembly line manufacture from standardized parts — and prompt delivery.

If you heat — or cool — liquids or gases in your plant, you'll get a lot of ideas from our Bulletin No. 512. Send for a copy!

BROWN FINTUBE

BROWN FINTUBE CO.

Elyria, Ohio



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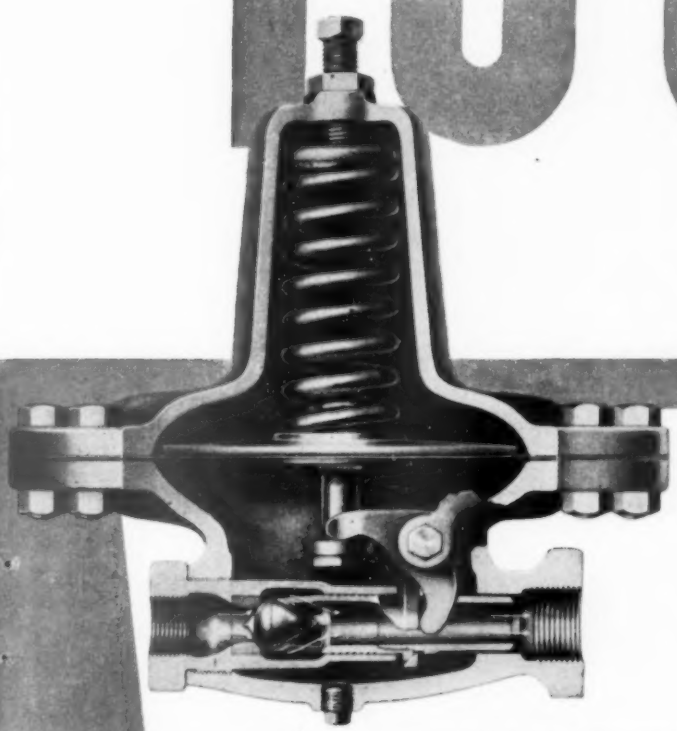
MEMPHIS • BIRMINGHAM • NEW ORLEANS • SHREVEPORT • TULSA • HOUSTON • DALLAS • DENVER • LOS ANGELES • SAN FRANCISCO • and ST. THOMAS, ONT.

TYPE 1000 VALVE



Any product of quality should be dependable when *ordinary* products fail. Sudden pressure fluctuations, dirt, scale and viscous matter prove "fatal" to ordinary pressure reducing valves.

The CASH STANDARD TYPE 1000 VALVE however, is designed to operate with complete dependability under the most difficult and unusual circumstances. Many of these units have been in service over 10 years and have never been taken "out of the line."

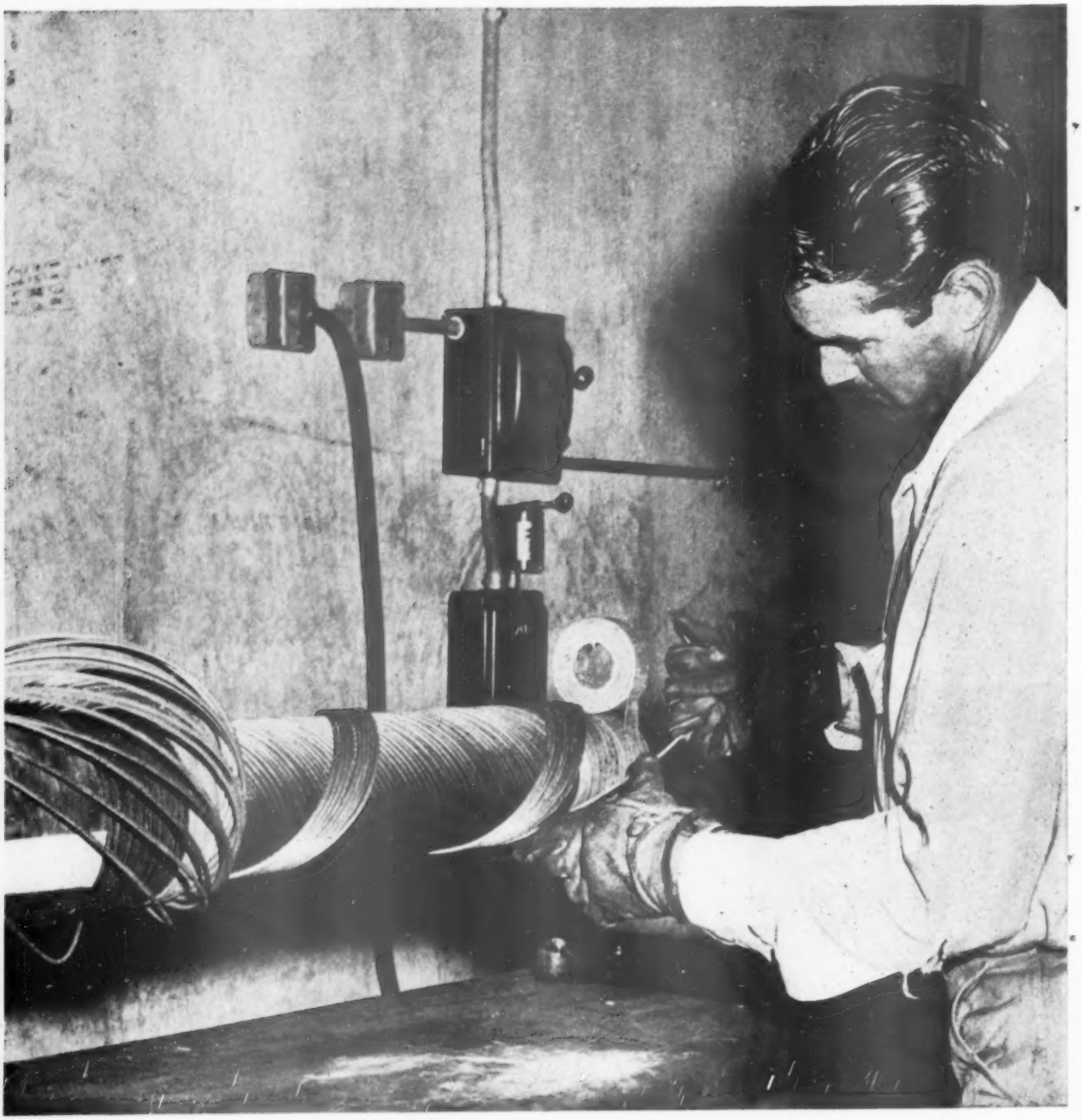
Truly an *EXTRAORDINARY* achievement of quality and design excellence.

INSTALL CASH STANDARD "TYPE 1000" VALVES

CASH STANDARD **DECATUR, ILLINOIS**

A. W. CASH COMPANY

Now Available in Texas . . .



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EXECUTIVE OFFICES, STAMFORD, CONNECTICUT

Factory Rotary Hose Repair!

Hewitt-Robins Announces Complete Factory Coupling Resetting and Salvage Service for Hewitt-Robins Cable-Reinforced Rotary Hose

Now we can give you thousands of feet of additional rotary hose wear—save you time—save you money. For no longer do you have to scrap valuable lengths of Hewitt-Robins Cable Reinforced Rotary Drilling Hose because of wear or rupture.

Here are the facts: We are now equipped to repair your worn or damaged hose and reset it with new couplings at our new factory repair service facilities in Houston, Texas. When more than 30-foot lengths of hose can be salvaged, we rebuild it as rotary hose and reset new Stratoline couplings, the exclusive in-line couplings available only on Hewitt-Robins rotary hose. When less than 30-foot lengths can be salvaged, we repair and recouple the hose to provide one or more lengths of Rotary Flexible hose. All lengths are carefully tested to rigid factory specifications and promptly returned to you.

This new money-saving, time-saving salvage and repair service is available only to owners of Hewitt-Robins Cable-Reinforced Rotary Hose . . . Here is one more cost-cutting reason why it always pays to buy your rotary hose from your local Hewitt-Robins Oil Field Supply Distributor. It's the best hose that money can buy . . . and now it can be repaired to give you longer life and provide thousands more feet of economical drilling.

For information and service on Hewitt-Robins hose products contact your Hewitt-Robins Industrial Supply Distributor. Through his complete stock of Hewitt-Robins Hose, and his familiarity with local field conditions, he can fill your supply needs promptly and correctly. See Classified Phone Book for the Hewitt-Robins Industrial Supply Distributor serving your area.

ROTARY DRILLING HOSE
FLEXIBLE VIBRATOR HOSE
MUD PUMP SUCTION HOSE
WATER SUCTION HOSE
WATER WASHDOWN HOSE
STEAM HOSE
SERVALL® (All-Purpose) HOSE
TWIN-WELD® HOSE

Hewitt-Robins Cable-Reinforced Rotary Drilling Hose is now available at these Oil Field Supply Outlets:

THE BETHLEHEM SUPPLY COMPANY of CALIFORNIA
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Avoid equipment breakdown—repair troubles. Use Harper Everlasting Fastenings designed to stop corrosion. Their additional cost is usually only a few pennies—pennies wisely spent to protect oil field and refinery machinery against sour crudes—salt spray—severe weathering.

With Harper Fastenings, you assure customers of corrosion-free operation, extra-dollar performance. And they're quickly available—Harper stocks over 7,000 different types and sizes of bolts, nuts, screws, washers and rivets. For special applications, a large staff of metallurgists and engineers is ready to help you work out the problem.

Behind Harper is the longest specialized experience with corrosion-resistant fastenings. As the world's largest exclusive producer in the field, Harper offers you the advantages of one account to keep—one order to write—one bill to pay.

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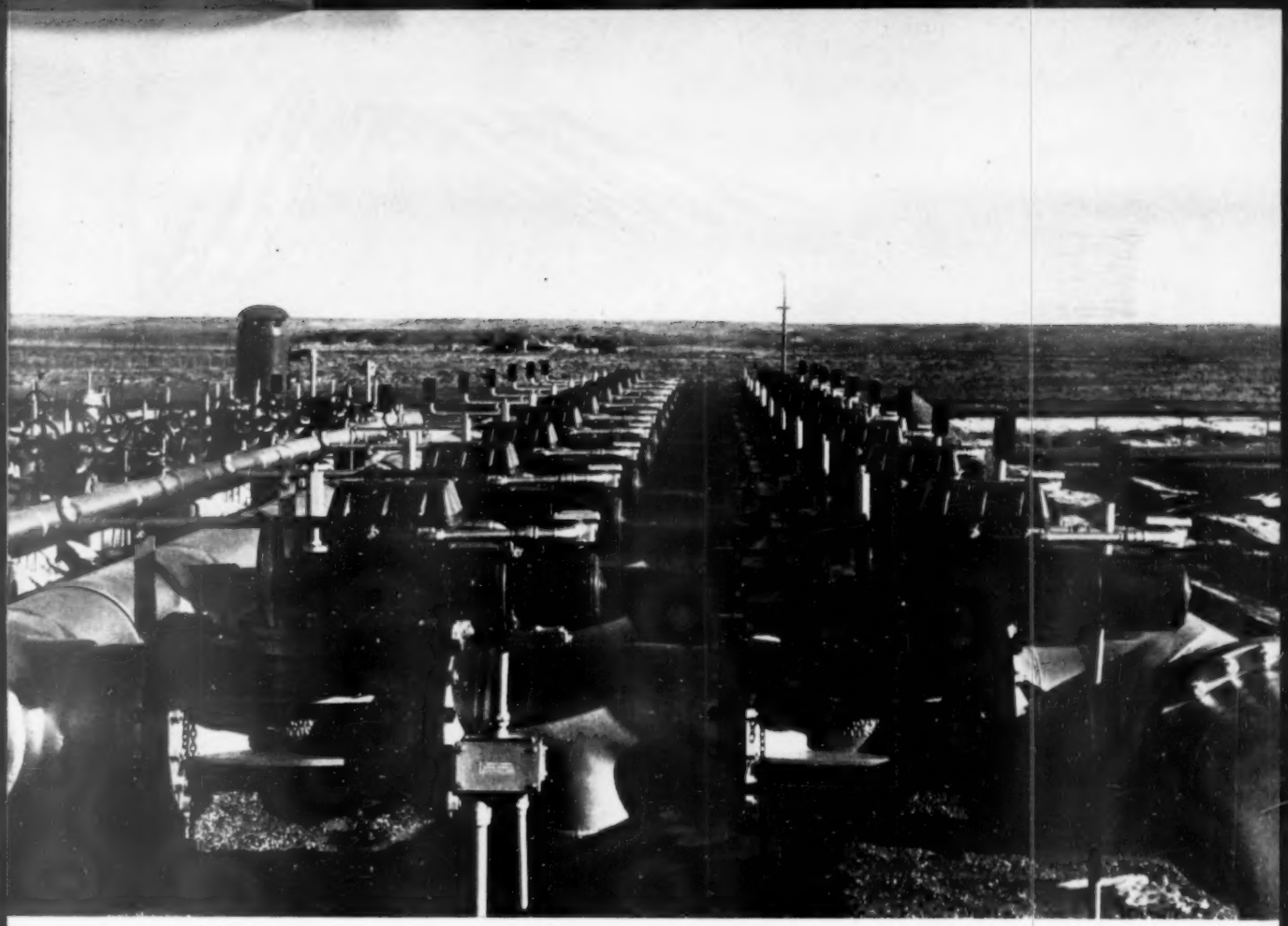

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In large manifolds, the superiority of Rockwell-Nordstrom valves quickly becomes apparent. Large numbers of Rockwell-Nordstrom valves, sometimes in company with other types of valves, are installed on lines that are operated frequently. It's easy to compare Nordstrom's trouble-free performance with that of ordinary non-lubricated valves.

Field testing of this kind is the best salesman Rockwell has. It proves that Nordstrom valves, with their exclusive system of pressurized internal lubrication, seal more tightly, last many years longer and operate more easily than any other type of valve.

Take a tip from manifold operators who have judged the performance of hundreds of valves. Install Nordstrom. For additional information on Nordstrom valves, write: Rockwell Manufacturing Company, Pittsburgh 8, Pa. *Canadian Licensee: Peacock Brothers Limited*

ROCKWELL-Nordstrom VALVES

Lubricant-Sealed for Positive Shut-Off

Saves

Time... Money... Labor

"K" Monel Collar Enables Accurate Control of Straight Hole or Directional Drilling

When you reach your target without deviation, you save substantially in rig time, labor and other expenses, which may only show up later.

You can make a *constant check* on deviation when you drill using a "K" Monel drill collar. For non-magnetic "K" Monel drill collars render it possible to make straight-hole tests *and* directional surveys at the same time . . . as often as you want. And without round-tripping pipe. That way you not only know whether you're keeping within property lines, but also, the exact direction of the well at every point. You have a complete record that you can refer to any time during the life of the well.

And, of course, for controlled directional drilling, a "K" Monel collar is practically essential.

When positioned in a "K" Monel collar, the survey instruments are not only free of magnetic effects from the drill string, but are also properly centered and aligned. And there are none of the hazards inherent in running instruments in open hole.

At all well temperatures, and regardless of cold-working, "K" Monel remains non-magnetic. Drilling contractors can lease "K" Monel collars from the Sperry-Sun Well Surveying Company at 3118 Blodgett Avenue, Houston 4, Texas.

Whatever your job, when you face an oil field metal problem, let Inco engineers help find the solution. From among the many Inco Nickel Alloys available, there is probably one that meets your needs, exactly. If not, they'll work with you to find the right answer.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

Accurate Drilling is assured in both vertical and directional work without pulling the string, when survey instruments are lowered into a non-magnetic "K" Monel drill collar. By insisting on this method, you can avoid excessive equipment wear and other operational difficulties caused by crooked holes.
(Picture courtesy of Sperry-Sun Well Surveying Company, Houston, Texas.)

Inco Nickel Alloys

Monel® • "R"® Monel • "K"® Monel • "KR"® Monel "S"® Monel • Inconel® • Inconel "X"® Inconel "W"® • Incoloy® • Nimonic® Alloys Nickel • Low Carbon Nickel • Duranickel®

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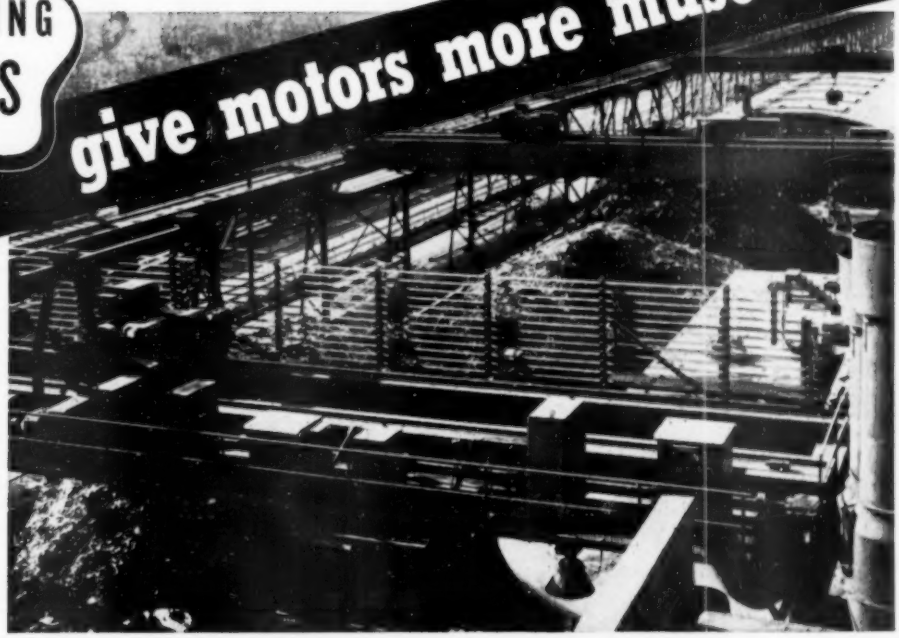
give motors more muscles



Rewound with Class H at a saving of $4800, intermittent-duty crane motors give continuous service

With the development of better methods for charging furnaces, 3 yard cranes in a large foundry were used to feed the cupolas in addition to normal yard work. As the work load became more continuous, armatures started to burn out in the Class A insulated dc hoist motors rated at 60 hp at 395 rpm for 50% intermittent duty.

The motors were then rewound with Class B insulation. But the work load continued to increase until the cranes were working constantly, 16 hours a day. With 3 cranes in service, motors failed at the rate of one every other week. Rewind costs mounted to $800-$1000 a month.

Then in July, 1952, one of the hoist motors was rewound with silicone (Class H) insulation at a cost of $800. That motor is still in service and both of the others have been Class H insulated to give continuous service without failure. New continuous duty mill-type motors would have cost $7200. Rewinding with Class H cost $2400. Savings, $4800 plus.

And that's why top management men as well as production and maintenance engineers are demanding silicone (Class H) insulation. It gives motors, transformers and solenoids as much as 50% more overload capacity, and about 10 times the service life of equipment built with the next best class of insulating materials. Now is the time to increase efficiency; cut overhead and maintenance costs.

mail this coupon today!

You can also reduce to a minimum motor outages due to bearing failure by using Dow Corning 44 Grease

In open and single shielded bearings designed for high temperature operation, Dow Corning 44 has 8 to 10 times the life expectancy of conventional greases. It gives life-time lubrication in permanently sealed bearings.

first in silicones

DOW CORNING CORPORATION

MIDLAND, MICHIGAN

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- ☐ List of Class H rewind shops
- ☐ List of Class H Motor and ☐ Class H Transformer Manufacturers
- ☐ "Tall Tales and Fabulous Facts" about silicone products

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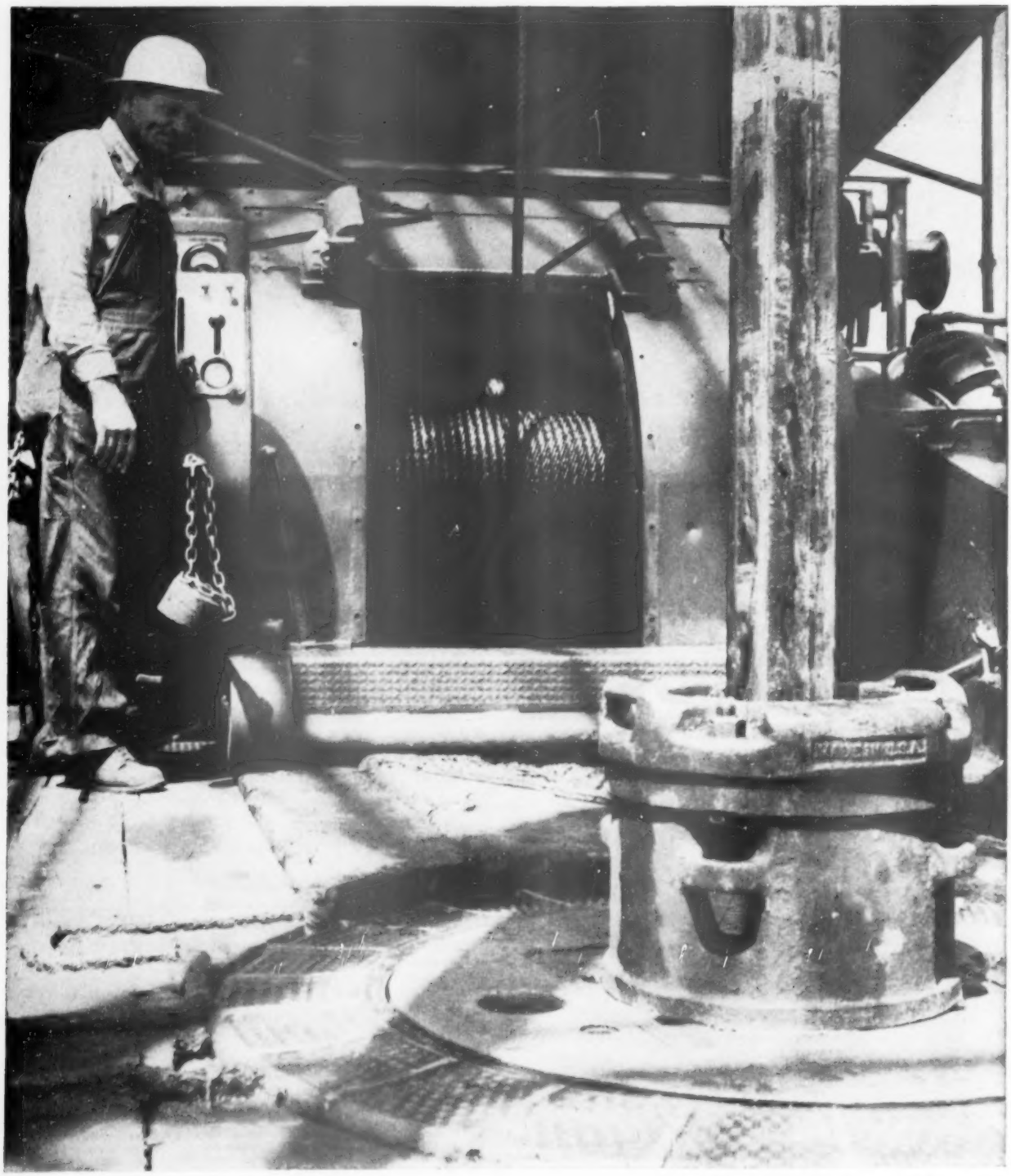
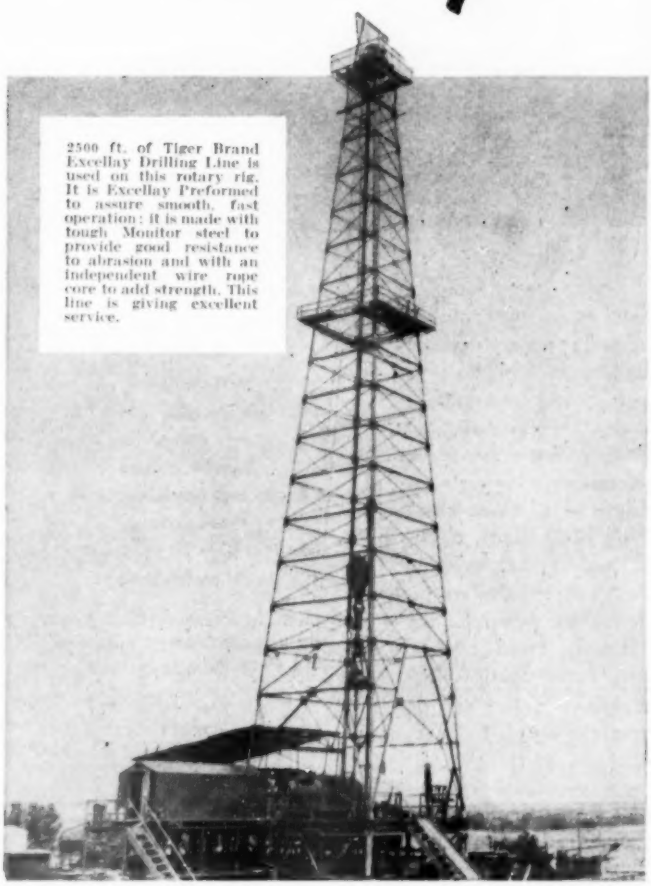
For long service



Oklahoma driller chooses Tiger Brand *Excellay* Wire Line



2500 ft. of Tiger Brand Excellay Drilling Line is used on this rotary rig. It is Excellay Preformed to assure smooth, fast operation; it is made with tough Monitor steel to provide good resistance to abrasion and with an independent wire rope core to add strength. This line is giving excellent service.

THIS rotary rig, owned by Beacon Drilling Co. of Tulsa, is working at about 8,000 ft. in the Panther Creek Field near Paul's Valley, Oklahoma. In order to be sure of getting a long-lasting drilling line that would keep line costs low, Beacon used a 1⅛" Tiger Brand *Excellay* Preformed Rotary Drilling Line with independent wire rope core.

Excellay preforming preshapes the strands to the helix they will be required to assume in the finished rope. As a result, Tiger Brand *Excellay* Line withstands bending much better than an ordinary wire rope. It has greater fatigue resistance and gives more ton miles of service before it must be replaced.

What's more, Tiger Brand Excellay Line is less likely to kink or twist than a non-preformed line; it is less lively; it can be spooled faster.

If you want these advantages in *your* drilling lines, specify Tiger Brand *Excellay*. This type of line also gives superior performance in coring lines, casing lines, winch lines, and rod and tubing lines. Your American Wire Line Distributor has complete information.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

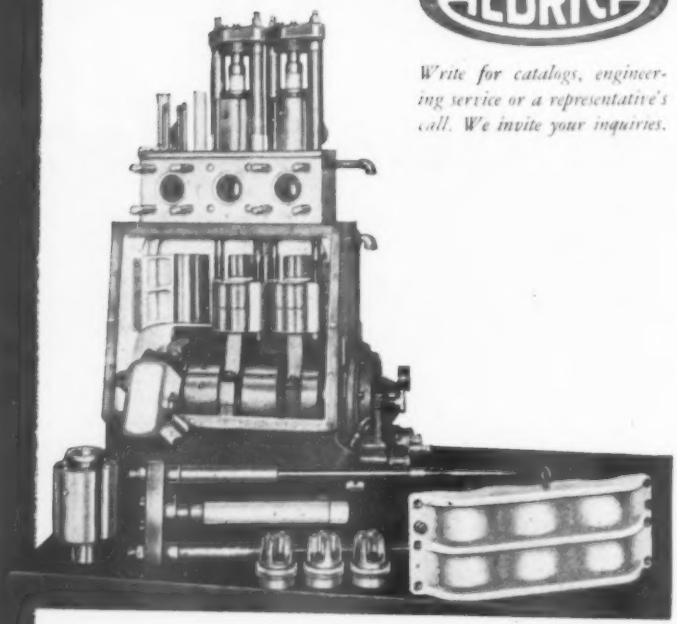
U·S·S AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

USS

UNITED STATES STEEL

Why ALDRICH PUMPS Reduce Maintenance Cost



ALDRICH

Write for catalogs, engineering service or a representative's call. We invite your inquiries.

Design simplicity . . . rugged construction

Aldrich Pumps are built to take punishing service year after year. You can find Aldrich Pumps, today, in good running order after 30, 40 and even 50 years of service. Durability such as this is the result of Aldrich's design simplicity and rugged construction.

Accessibility . . . sectionalization

When wearing parts are due for replacement, in Aldrich Pumps they can be replaced easily, quickly and at low cost. For instance, manifolds can be moved out on the holding studs and you can lift out and replace valves as complete units. . . . Stuffing boxes are particularly accessible—making it easy to renew packing. . . . To meet a change in pressure or capacity requirements, plunger sizes can be changed — in most cases merely by using new glands, throat bushings and packing in the same fluid-end. . . . Wearing parts are interchangeable among pumps of the same stroke size. . . . Fluid-ends are sectionalized to make possible low cost parts replacement and can be made of stainless steel, bronze, Monel or other material.

Aldrich Pumps Are Used For:

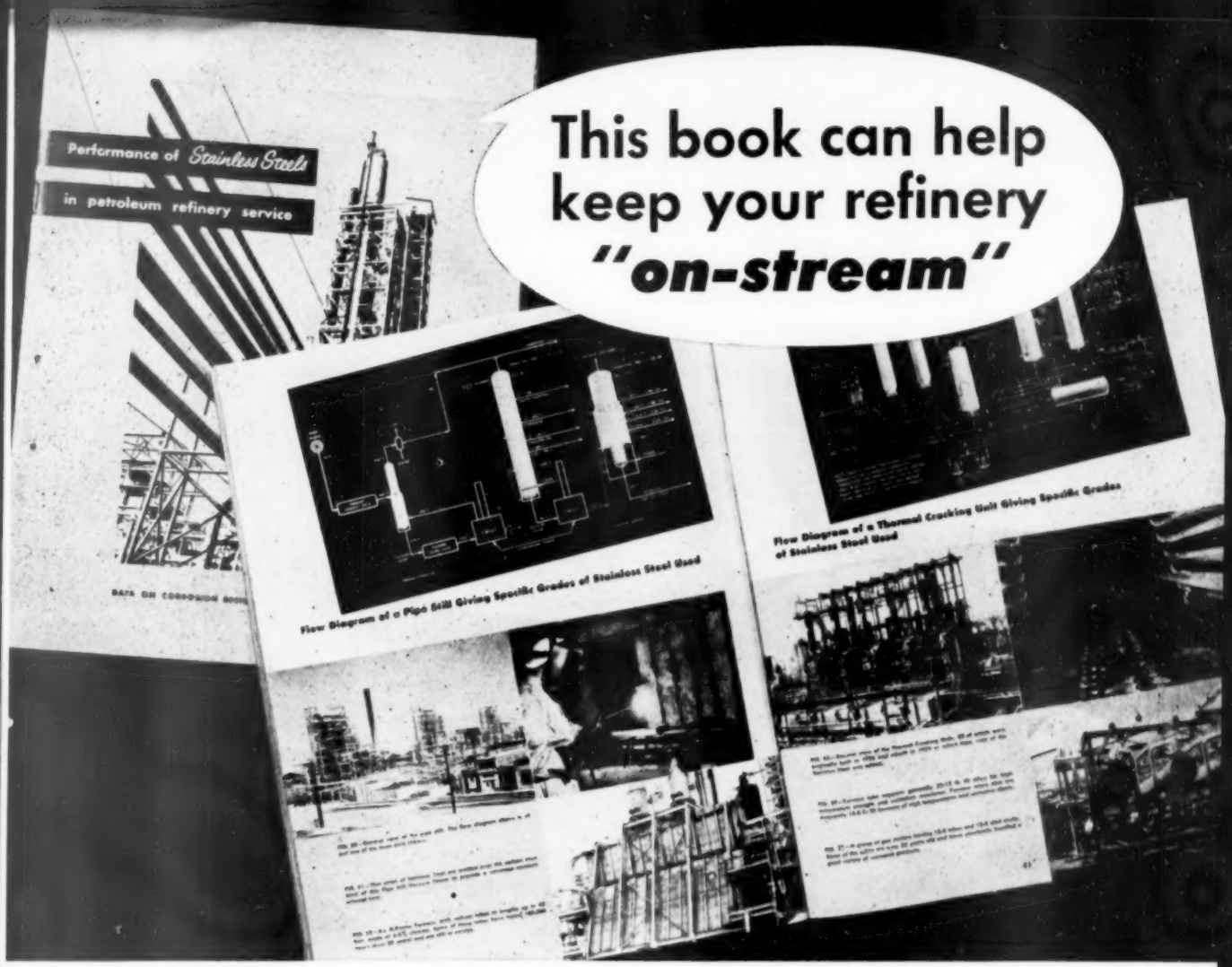
Water flooding
Salt water disposal
Lean oil service
Reactor charge
Crude and gathering lines
Product lines
Bottom hole pump service
Liquid hydrocarbons

Aldrich Pump spare parts are stocked at Mid-Continent and California locations.

Representatives in Principal Cities

The Aldrich Pump Company

9 Gordon Street • Allentown • Pennsylvania


Performance of Stainless Steels
in petroleum refinery service
This book can help keep your refinery "on-stream"
Flow Diagram of a Pipe Still Giving Specific Grades of Stainless Steel Used
Flow Diagram of a Thermal Cracking Unit Giving Specific Grades of Stainless Steel Used

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WITH Stainless Steel playing such an important role in your never-ending fight against down time, here is just the information you need to use this valuable material most effectively.

It's United States Steel's new book, "Performance of Stainless Steel in Petroleum Refinery Service." Based on the actual experience of some of America's largest refineries with Stainless Steel, it presents one of the most comprehensive studies ever made of application of Stainless Steel to the petroleum industry.

It discusses fully all types of corrosion—atmospheric, wet chemical, elevated temperature and such forms of intergranular corrosion as carbide precipitation, attack by molten metals and sulphur attack.

It presents strength data on 14 of the grades of U·S·S Stainless Steel most frequently used in high temperature service.

And, finally, it gives you flow diagrams of processes in use in major refineries, showing exactly where Stainless Steel is used. These processes include Thermal Cracking Units, Lube Oil Extraction Plants, Pipe Stills and Fluid Catalytic Cracking Units.

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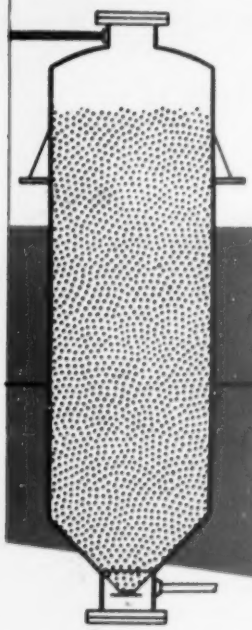
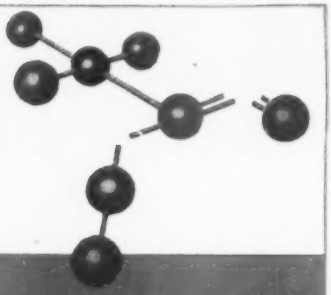


...ready to tackle any sorptive-mineral job that comes along...



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POROCEL Activated Bauxites

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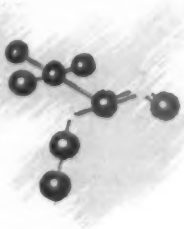
There's an Attapulgus or Porocel adsorbent to fit your process technique for removing odors, colors, tastes, moisture, acids, sulfur, fluorides and unsaturates from process liquids or gases. Materials treated in principal applications are: motor oils and other lubricating, specialty, and technical oils; petrolatums and waxes; aviation and motor gasoline stocks; kerosene; diesel and heating oils; chemicals and petrochemicals.

CATALYSTS, CATALYST CARRIERS

Our sorptive minerals are recognized standards in desulfurization, reforming and isomerization systems—catalytic removal of unsaturates—conversion of sulfides to elemental sulfur—fluid catalyst applications—as catalyst carrier in copper sweetening processes.



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Mine and plant facilities permit prompt and economical production of grades meeting individual customer specifications. Our laboratories and technical staffs are ready to assist in research, development, design and operating problems. Your inquiries are invited.

ATTAPULGUS MINERALS & CHEMICALS CORPORATION · **POROCEL** CORPORATION

Dept. V, 210 West Washington Square, Philadelphia 5, Pa.

3 A.M. and business most unusual!

Though it's 3 o'clock in the morning, this could very well be a National Supply store in downstate Illinois . . . or west Texas . . . or southern California. Inside you could expect to find a National Supply man yawning his way through bins of parts, prior to leaving for a rig out in his territory.

You could well ask yourself why this time of night for a call? The answer is simple and complete . . . a National Supply customer is in a jam, and needs help fast to keep up his round-the-clock drilling.

This individual spirit of helping friends when chips are down and needs are great has marked National Supply men from the very first days of the petroleum industry. No company rule creates this spirit—but when help is really needed, you are bound to find it among the hundreds of National Supply field men who man the network of 117 stores throughout oil country.

This spirit might be another reason why you, and thousands of customers like yourself, have made National Supply the world's largest oil country supply organization . . . and keep it that way year after year.

First in quality...
First in supply service
in oil country everywhere

NATIONAL BLUE PRODUCTS

THE NATIONAL SUPPLY COMPANY

PITTSBURGH 30, PENNSYLVANIA

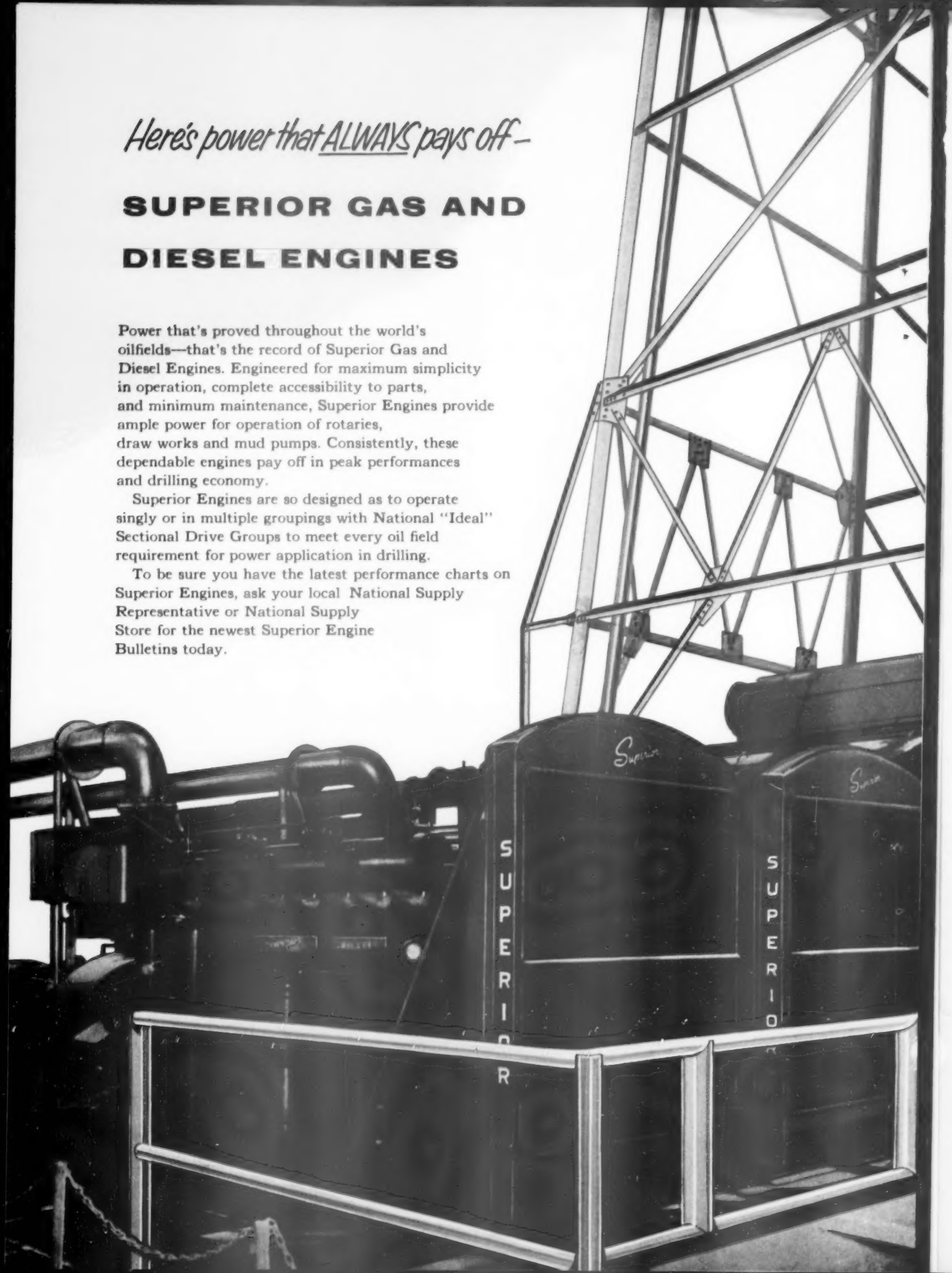
Here's power that ALWAYS pays off—

SUPERIOR GAS AND DIESEL ENGINES

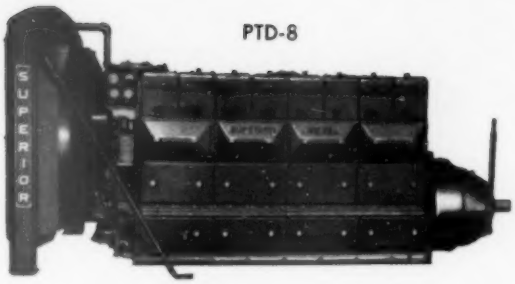
Power that's proved throughout the world's oilfields—that's the record of Superior Gas and Diesel Engines. Engineered for maximum simplicity in operation, complete accessibility to parts, and minimum maintenance, Superior Engines provide ample power for operation of rotaries, draw works and mud pumps. Consistently, these dependable engines pay off in peak performances and drilling economy.

Superior Engines are so designed as to operate singly or in multiple groupings with National "Ideal" Sectional Drive Groups to meet every oil field requirement for power application in drilling.

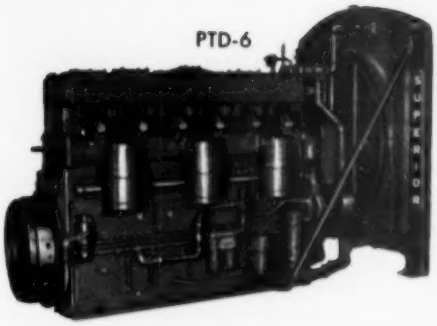
To be sure you have the latest performance charts on Superior Engines, ask your local National Supply Representative or National Supply Store for the newest Superior Engine Bulletins today.



PTD-8



PTD-6

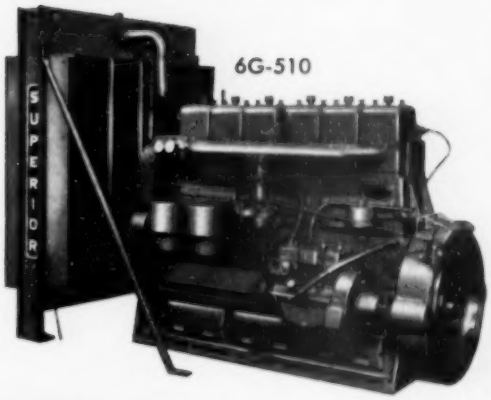


...and here's the Superior power line-up for every Drilling need

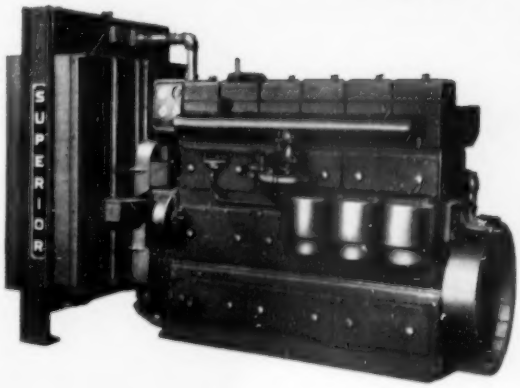
RATINGS

Model No.	B.H.P. (intermittent)	No. of Cylinders	R.P.M.	Type of Fuel
6G-510	370	6	1000	Natural Gas
6G-825	510	6	900	Natural Gas
8G-825	675	8	900	Natural Gas
PTD-6	325	6	900	Diesel or Dual Fuel
PTD-8	435	8	900	Diesel or Dual Fuel
PTDS-6	500	6	900	Diesel or Dual Fuel
PTDS-8	670	8	900	Diesel or Dual Fuel

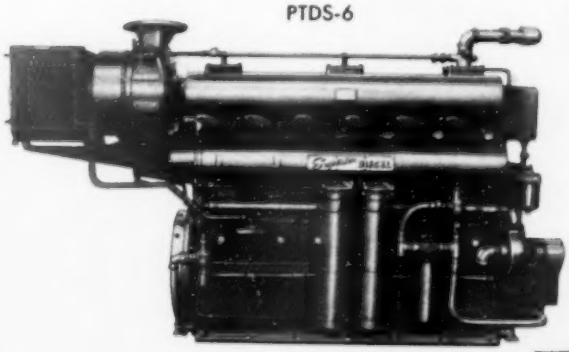
6G-510



6G-825



PTDS-6



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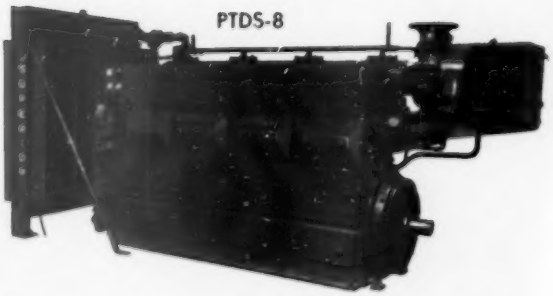
NATIONAL BLUE PRODUCTS

PTDS-8



THE NATIONAL SUPPLY COMPANY
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DIVISION OFFICES: Denver, Ft. Worth, Houston, Pittsburgh, Tulsa, Torrance

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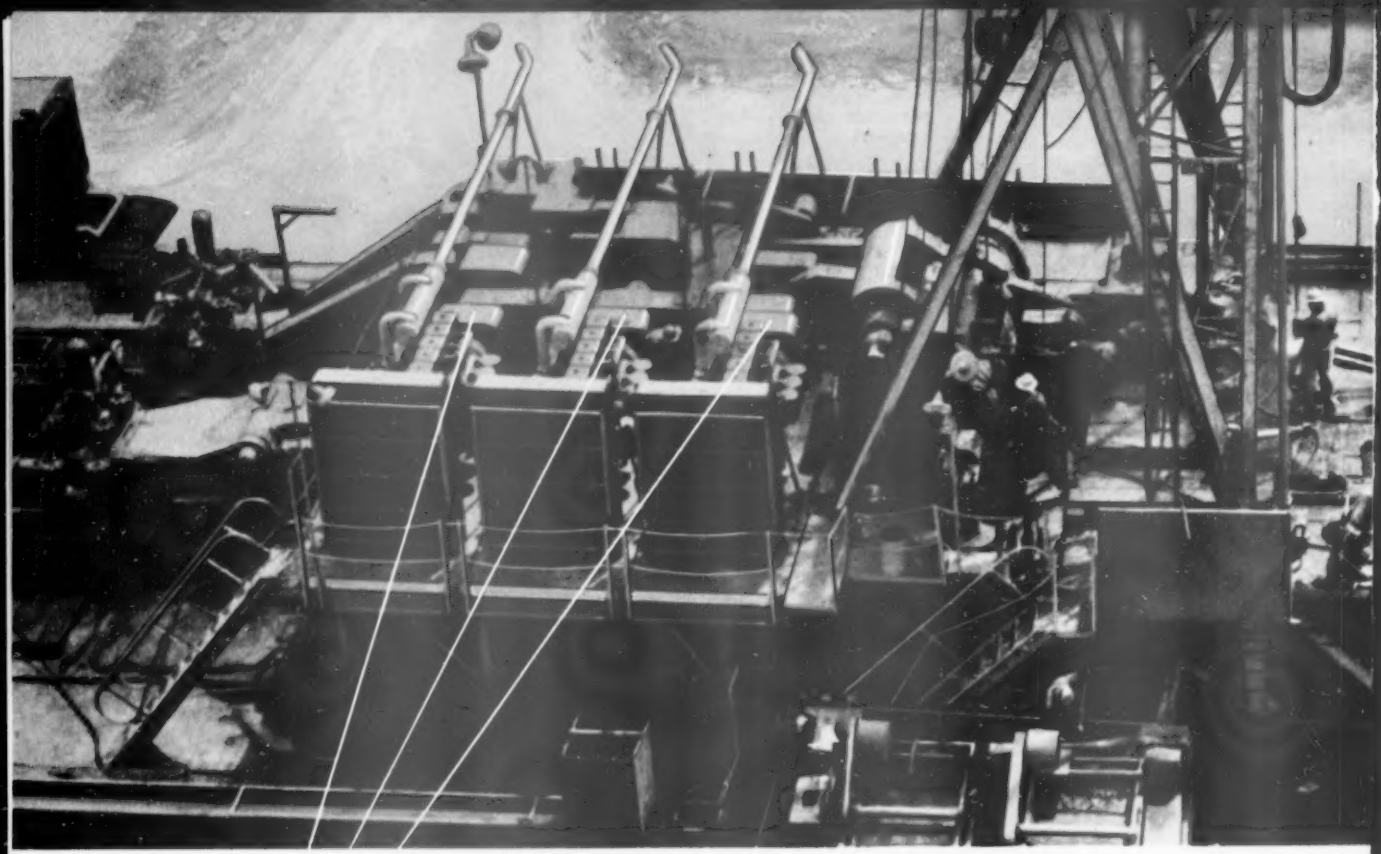
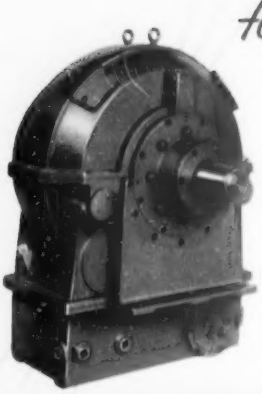
EXPORT: 600 Fifth Avenue, New York 20, N. Y., U. S. A., River Plate House, 12 South Place, London E. C. 2

for important news affecting drilling costs *see next page*

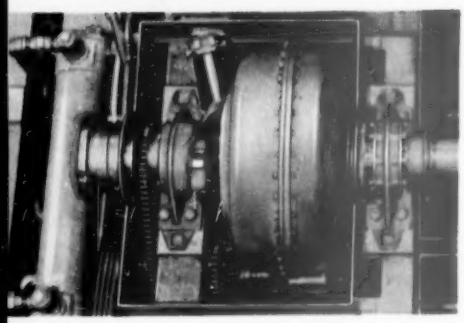


for NEW ECONOMIES in rig operation—



IDEAL® GYROL FLUID DRIVE OR

NATIONAL TORQUE CONVERTERS



Lower maintenance costs and faster, easier operation are two of the outstanding benefits oil men everywhere are getting with Ideal Gyrol Fluid Drive and National Torque Converters. Here's how these highly-efficient hydraulic drives:

SAVE MONEY—Starting shocks, torsional loads and harmonic vibrations are readily dissipated—even sudden shock loads are reduced by as much as 75%! The results are less wear and tear on your entire rig investment, fewer breakdowns and less spent for replacements and repairs.

SAVE TIME—Engines cannot be stalled and there's no need to synchronize throttle, drum clutch and brake controls. Clutches can be engaged with engines idling and loads are easily picked up by forward movement of the throttle. This ease of control, plus the maximum effective use of engine power, gives you faster round-trips. These National hydraulic drives, with Ideal Sectionalized Drive Groups and reliable Superior Engines, give you a rig power system ready for the toughest jobs in its range. You'll find it worthwhile to know more about Ideal Gyrol Fluid Drive and the National Torque Converter—ask your local National Supply Representative for details.

First in quality...
First in supply service
in oil country everywhere

NATIONAL BLUE PRODUCTS

THE NATIONAL SUPPLY COMPANY

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Proof of Sustained Leadership!

More than 50% of *Carburetor Type Engines from 3 to 40 H.P., Produced and Sold in 1952 for Re-Sale or Original Equipment Power *were*

WISCONSIN ENGINES

** Does not include automotive, aircraft, outboard marine or "captive" engines made by manufacturers for use on their own equipment.*

Again official U. S. Government statistics provide positive proof of Wisconsin Air-Cooled Engine leadership, based on figures contained in Bureau of The Census release, dated Oct. 5, 1953.

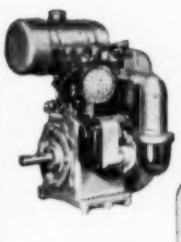
These statistics, compiled from reports received by the Census Bureau from 94 manufacturers of Internal Combustion Engines, indicate that Wisconsin Motor Corporation produced more engines within our horsepower range, *than all other engine manufacturers combined.* This includes all Census Bureau classifications from 11 to 175 cu. inch piston displacement, although the smallest Wisconsin Air-Cooled Engine has a displacement of 13.5 cu. inches, and the largest 154 cu. inches.

The breakdown, based on Census Bureau groupings is as follows:

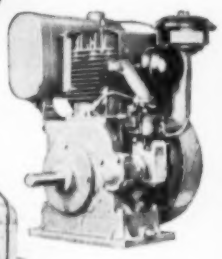
11 to 50 cu. in. displ., Wisconsin's share	**54.22%**
51 to 100 cu. in. displ., Wisconsin's share	**72.51%**
101 to 175 cu. in. displ., Wisconsin's share	**29.44%**

The aggregate average of Wisconsin Heavy-Duty Air-Cooled Engines, within the above power classifications, amounts to more than 50% of the total . . . in excess of the combined output of the other 93 engine manufacturers covered by the survey.

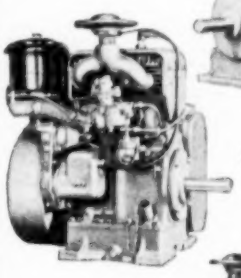
This Proof of Preference should be of special interest to all original equipment purchasers, users, distributors and dealers because it is indicative of outstanding Customer Satisfaction . . . based on Wisconsin Engine Structural and Operating Power Advantages. It pays to back a winner!



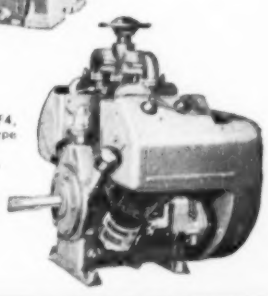
Models ABN, AKN, AEN, 4-cycle single cylinder, 3 to 8¼ hp.



Models AFH, AGH, AHH, single cylinder, 6 to 9 hp.



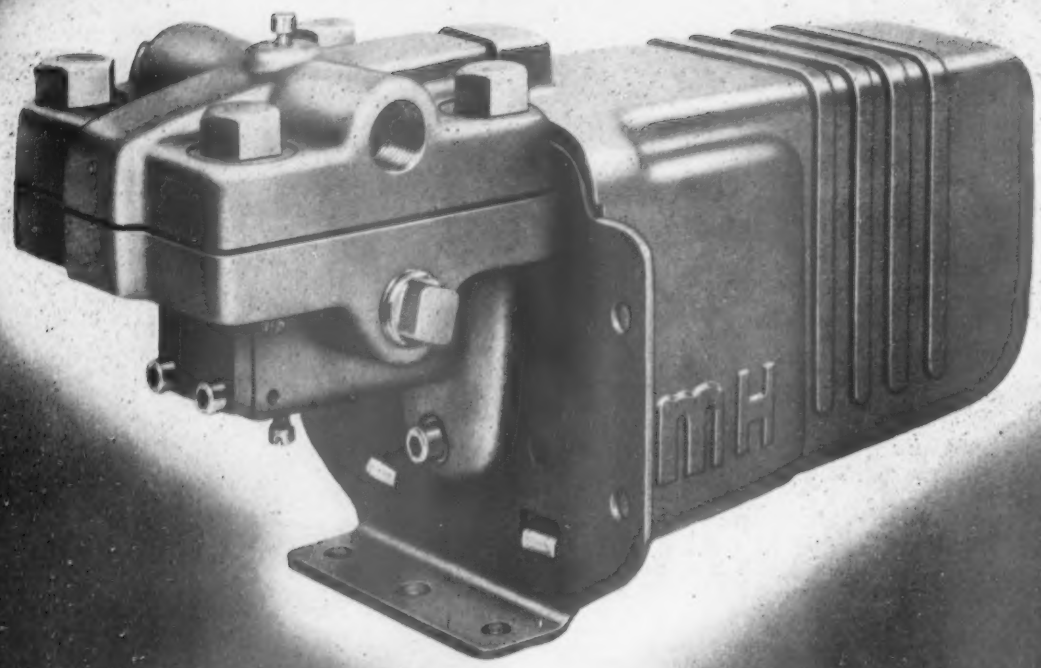
Models TE and TF, 2 cylinder, 7 to 15 hp.



Models VE4, VF4, and VG4D, V type 4 cylinder, 15 to 36 hp.

WISCONSIN MOTOR
Corporation
MILWAUKEE 46, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines

WRITE TO HARLEY SALES CO.
619 S. MAIN STREET, TULSA, OKLAHOMA
M & M BUILDING, HOUSTON, TEXAS
505 SOUTH MAIN ST., WICHITA, KANSAS
OIL FIELD DISTRIBUTORS FOR WISCONSIN ENGINES AND ALL TYPES OF UTILITY UNITS.



compare these features!

simplicity:
uses no mercury; a rugged pneumatic balance transmitter, it has few moving parts . . . needs practically no maintenance.

wide range:
readily adjustable in the field for ranges from 0–20 to 0–200 inches of water.

simple calibration:
easily calibrated with weights . . . no curves or tables needed; 1 lb. equals 10" of water.

withstands overloads:
takes many times rated pressure without loss of accuracy or damage to working parts.

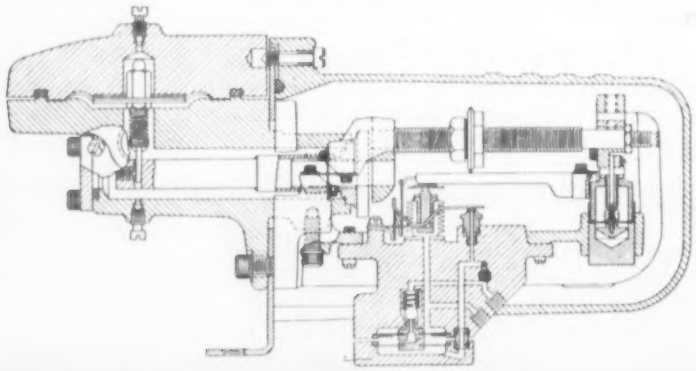
for use with miniature instruments:
converts pressure differential at the metering orifice into a proportional air pressure for transmission to remote indicators, recorders or controllers. The ideal companion for *Tel-O-Set* miniature instruments.

temperature range:
handles fluids at temperatures as high as 350° F.

versatility:
available with or without non-bleed pilot booster relay.

sensitivity:
responds rapidly to quick changes in flow.

easy installation:
lightweight, compact unit is readily mounted anywhere.



For flow measurements—the **HONEYWELL DIFFERENTIAL CONVERTER** *is better than ever*

NEW CONSTRUCTION features now make the Honeywell Differential Converter, more than ever, the standard of performance for remote measurements of flow and differential pressure.

It's more accurate than ever . . . has improved linearity of response. It's more stable, with a larger dashpot and heavier oil to smooth out spurious line fluctuations. And it's even more rugged . . . can take overloads of many times normal pressure without damage to the diaphragm or impairment of precision.

More than ten thousand Honeywell Differential Converters have been installed on an ever broadening variety of applications . . . on pipelines, in conjunction with graphic instrumentation, and in scores of other uses which need accurate, flexible remote transmission of measurements.

You can see what's behind this industry-wide acceptance, by checking the Differential Converter's outstanding features described on the opposite page. You can find out even more by testing it yourself, under any operating conditions your plant may present. And for a personal discussion of your individual process requirements, call your local Honeywell sales engineer . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Aves., Philadelphia 44, Pa.

● REFERENCE DATA: Write for new Bulletin 2290, "Honeywell Differential Converters."

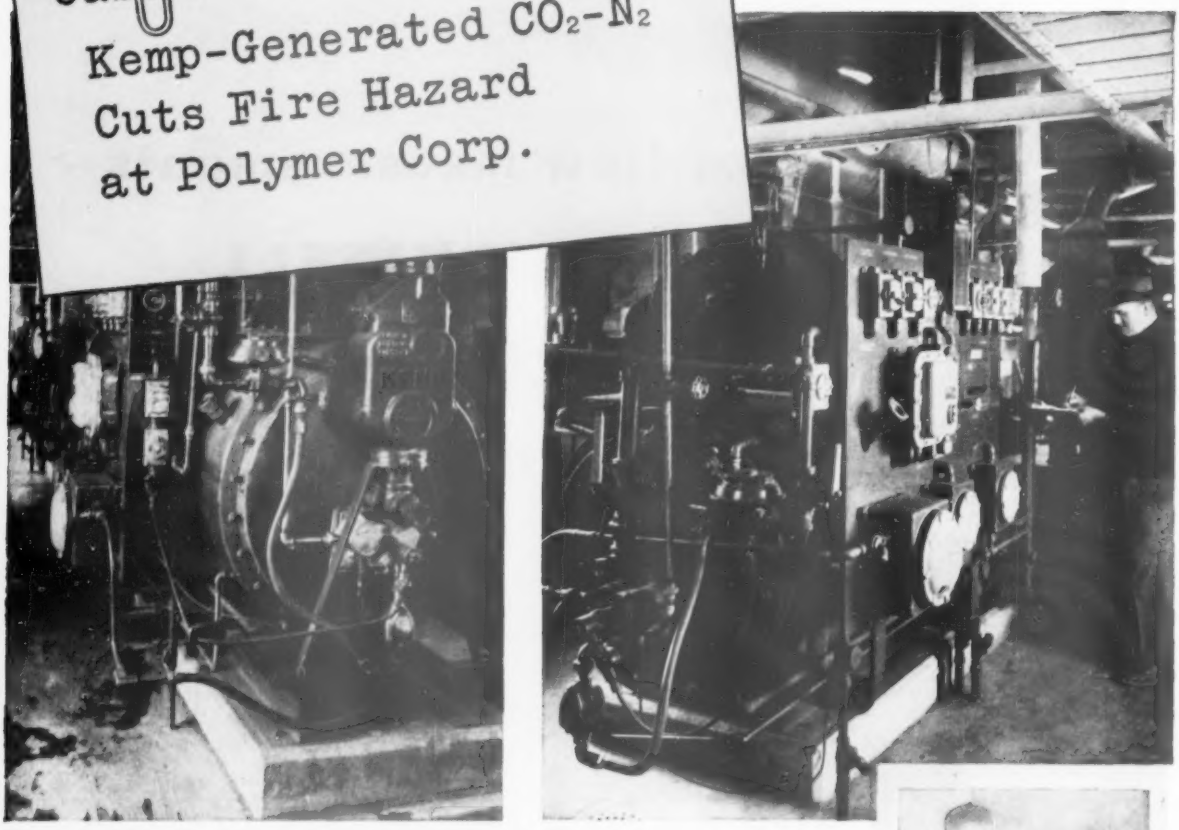
MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

First in Controls

Case No. 62

Kemp-Generated CO_2-N_2 Cuts Fire Hazard at Polymer Corp.



How Polymer operated day and night for 10 years at maximum safety

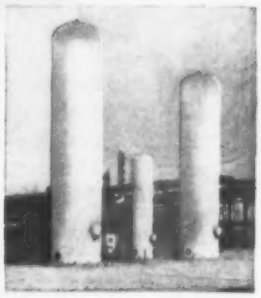
When Polymer Corporation, Ltd., Sarnia, Ontario, began operations in 1943, inventory included two Kemp MIHE Inert Gas Generators. Since that date, Polymer—and its Kemp equipment—has been operating 24 hours a day, 365 days a year. The huge quantities of man-made rubber and associated chemicals it produces—200,000,000 pounds during one year alone—reach, in one form or another, the four corners of the world.

Kemp Plays an Important Role

The high volatility of many of the ingredients used in this giant operation necessitates blanketing and purging vessels after use. It is in this step that Polymer employs Kemp Generators to assure safe, trouble-free performance. The gas they produce is piped to different operations over the entire company area—it *must* be clean! Kemp does the job—Polymer knows that it can depend on Kemp to deliver a *clean inert at a specific analysis, regardless of demand*. And every Kemp Generator is engineered for fast starts and easy operations that save *time* and *money*.

Kemp Can Do a Job for You

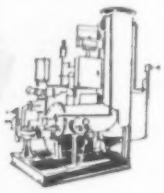
Kemp superiority is no accident. It is based on years of experience . . . on quality of design to meet specific problems. Every Kemp design features the Kemp Industrial Carburetor for complete combustion without tinkering or waste . . . for simplified installation and maintenance. Every Kemp design includes the latest fire checks and safety devices. If you have a blanketing or purging problem, contact Kemp engineers. They will be glad to study your situation and recommend the installation best suited to your needs. No obligation, of course.



Gas generator building from which inert gas is piped over 130 acres of company property at Polymer's Sarnia, Ontario, operation.

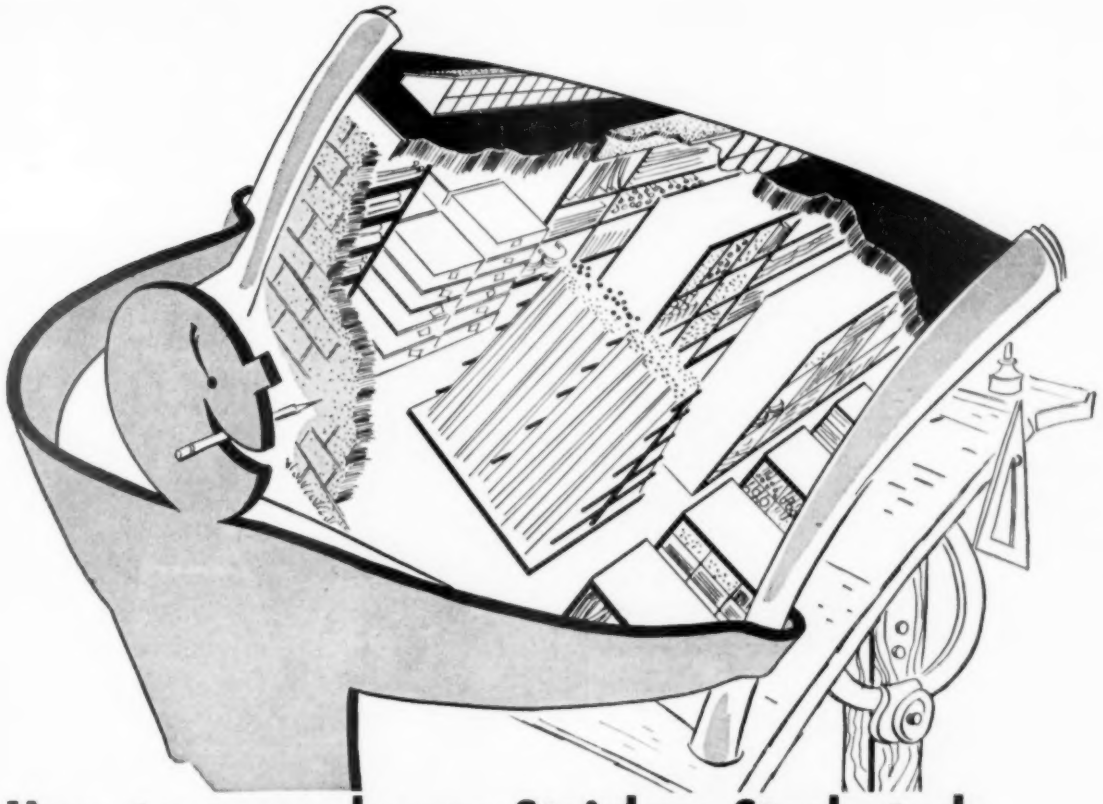
For more complete facts and technical information, write for Bulletin I-10 to: **THE C. M. KEMP MFG. CO., 405 East Oliver Street, Baltimore 2, Md.**

KEMP OF BALTIMORE



INERT GAS GENERATORS

CARBURETORS • BURNERS • FIRE CHECKS
METAL MELTING UNITS • ADSORPTIVE DRYERS
SINGEING EQUIPMENT



How to expand your Stainless Steel stock

—at no extra cost to you!

Why carry a big inventory of stainless steel to be sure you always have the exact type, grade, and size on hand? It's a practice that ties up working capital and floor space —increases payroll and overhead.

Let us carry your stainless steel stock in our warehouses. Let us show you service that's practically as fast as getting the stock from your own racks. You can count on Metal Goods Corporation to give you the *convenience* of your own stockroom *plus* the completeness of large warehouse stocks of stainless located in the Central South, Southwest, and Rocky Mountain regions. And *all this without the cost* of carrying any stainless in stock yourself!

Call the nearest Metal Goods Corporation representative today—he's ready to help you.

METAL GOODS CORPORATION

Also distributors of aluminum, brass, copper, nickel*, monel*, inconel*, and steel.

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St. Louis 15, Missouri
5239 Brown Avenue
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Phone: GOodfellow 1234

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Frank D. Hogan
Phone: NOrclay 3516

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Phone: ELmhurst 3271

Tulsa 3, Oklahoma
502 North Boston
Scott J. Harrison
Phone: 4-4101

Denver 2, Colorado
2425 Walnut Street
Neal Dehn
Phone: AComa 5891

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711 Milby Street
Harris T. Gregg
Phone: CEntral 8881

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Lee T. Dodson
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San Antonio, Texas
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Charles I. MacKenzie
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Memphis, Tennessee
713 Columbian Mutual Tower Bldg.
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Phone: 5-8721

Fort Worth, Texas
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John M. Turbitt
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Roy D. Bagaley
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Jackson, Mississippi
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C. M. Cooley
Phone: WAlnut 1112

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Harry L. Newton
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Des Moines, Iowa
2600 Woodland
W. P. Crowley, Jr.
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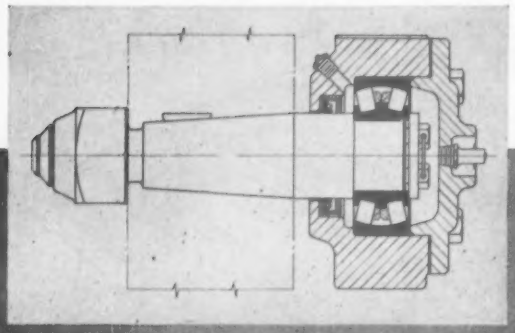
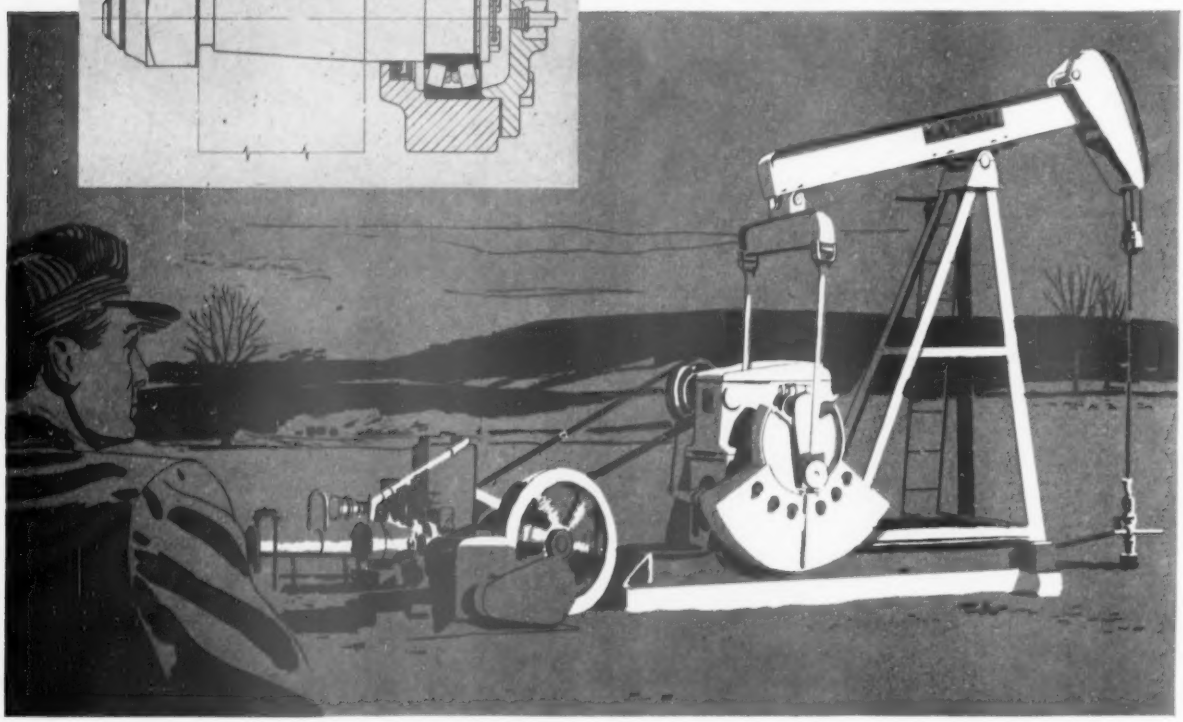
GENERAL OFFICES: ST. LOUIS 15, MISSOURI

**Not stocked in St. Louis and Kansas City*

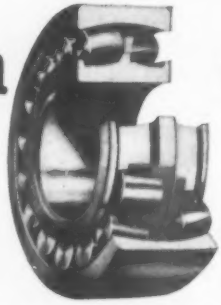
TORRINGTON BEARINGS AT WORK



Wrist pins of National Supply Company pumpers turn smoothly under severest conditions on precision-ground, self-aligning TORRINGTON Spherical Roller Bearings. For high capacity and simplified design, saddle, equalizer and beam hanger assemblies are equipped with TORRINGTON Heavy-Duty Needle Bearings.



Boosting production in unit pumpers!



Wrist pin assemblies in modern pumpers are typical of the scores of heavy-duty applications where TORRINGTON Spherical Roller Bearings help boost petroleum production.

TORRINGTON Spherical Roller Bearings are self-aligning. They compensate for deflection, roll freely, continuously under severest operating conditions.

They're precision ground to high geometrical conformity from top-quality alloy steels. Thus they cut friction to a practical minimum, carry heavier loads. *And* they're built with cast-bronze, land-riding cages (one for each path of rollers). They offer the *radial stability essential to accurate roller guiding* and *longer bearing life.*

TORRINGTON Spherical Roller Bearings are available from stock with either straight or tapered bore, for shaft or adapter mounting. Try them in your own pumpers and other heavy-duty equipment... join the growing number of builders and users who know from experience *it pays!*

THE TORRINGTON COMPANY

Torrington, Conn. South Bend 21, Ind.

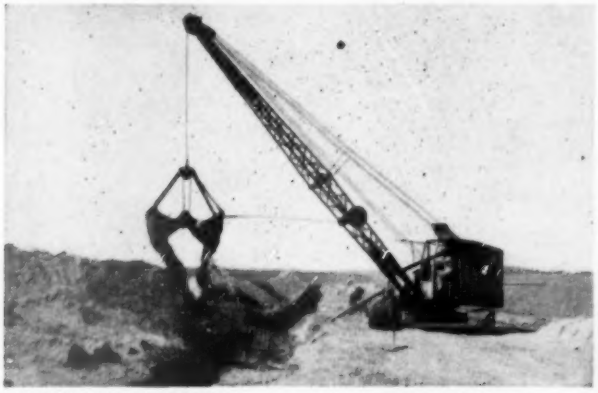
TORRINGTON SPHERICAL ROLLER BEARINGS

Spherical Roller • Tapered Roller • Cylindrical Roller • Needle • Ball • Needle Rollers

PIPELINE HEADLINES

A 25-TON LORAIN MOTO-CRANE, *equipped with clamshell bucket, moved in on this trench when glacial boulders were encountered. Moto-Crane rubber-tire mobility with 30 m.p.h. travel speed fills emergency calls all along the line.*

A LORAIN HOE *handled the trenching on much of the toughest digging through glacial rock. Note the extra-wide crawlers (13 ft. in width) that straddle trench with plenty of clearance to prevent cave-ins — a Lorain special feature for pipeline duty.*



A LORAIN "TL" CLAMSHELL *on crawler mounting kept operations going even when water and quicksand interfered. Front end interchangeability makes any Lorain 5-machines-in-1 — to serve on scores of digging, lifting, loading operations — from unloading of pipe to trenching in rock.*

TIOGA & BEAVER LODGE...

North Dakota pipeline project

These photos were taken on the "headline" job in the Tioga and Beaver Lodge, North Dakota field. These 3 Lorains are shown on the gathering system that will pick up the casing head gas at all of the wells in the Tioga and Beaver Lodge fields and transmit it to a new $15,000,000 natural gasoline processing plant and gathering system being constructed at Tioga by the Signal Oil & Gas Company. Here it will be converted into sulphur, butane-propane, natural gasoline and pipeline natural gas.

WILLIAMS BROS. CO...

a 27-time Lorain owner

These well-known pipeliners make pipeline construction "headlines" wherever they go. With their giant spreads, Williams Bros. Co., have tackled the biggest jobs both here and overseas. The Signal Oil job is one more example of their ability to lick the toughest of them. Williams men know from experience that only the best equipment can "take it" on this rugged work. They have chosen Lorains twenty-seven times so far.

LORAINS ON THE JOB...

Lorains go where the pipelines go!

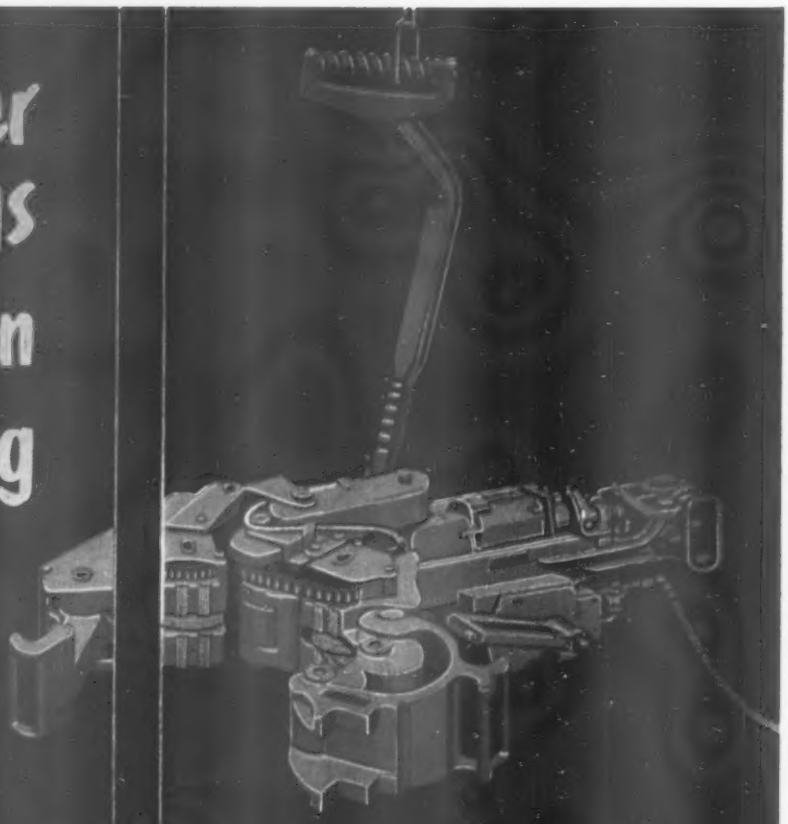
Where there are pipeline "headlines", there are Lorains! Here are the reasons. Thew-Lorain listened to the needs of pipeliners and then designed models with the features they most needed and wanted, such as . . . special extra-long and extra-wide crawlers to straddle trenches and to provide maximum stability . . . easy dumping hoe buckets . . . tread-travel locks conveniently and power-operated from the cab . . . replaceable tread pin bushings . . . sealed idler rollers . . . plus a wide selection of crawler and rubber-tire mountings in a wide range of capacities and front ends . . . to meet your needs anywhere along the pipeline job.

Thew-Lorain Distributors in 146 locations place rapid-fire Lorain service close to your job.

THE THEW SHOVEL CO., LORAIN, OHIO

THEW LORAIN®

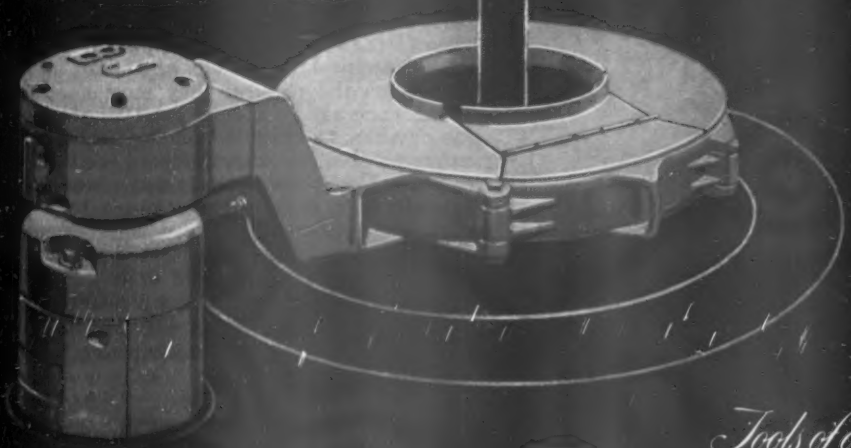
power pays off in drilling



POWER TONG

BJ

POWER SLIPS



Tools of our Trade No. 4

BJ MEANS ENGINEERED OIL TOOLS

BJ PB

Byron Jackson Co. *Since 1872*

LOS ANGELES NEW YORK FORT WORTH HOUSTON

BJ MEANS ENGINEERED OIL TOOLS

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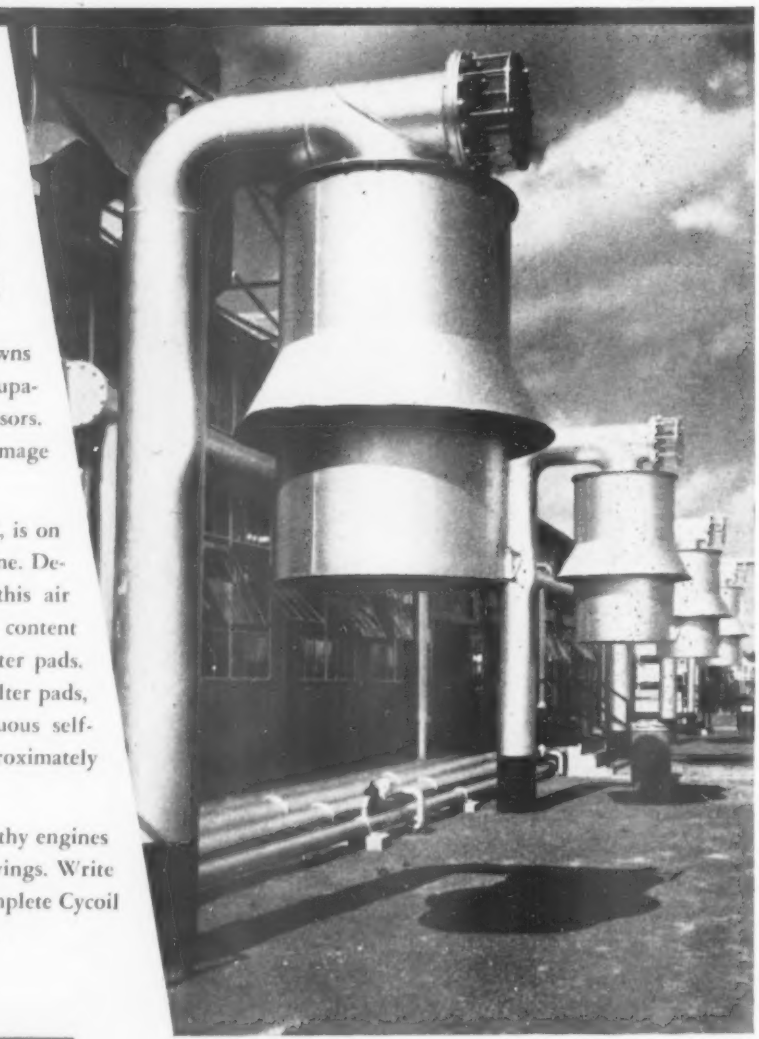
"DUST DOCTORS" to Industry



CYCOIL OIL BATH AIR CLEANERS GUARD HEALTH — PROLONG LIFE of ENGINES and COMPRESSORS

Dust damage, resulting in costly shutdowns and repairs, was once accepted as an occupational disease among engines and compressors. Today, "down time" traceable to such damage is an exception rather than the rule.

The reason—Cycoil, the "dust doctor", is on the job practicing true preventive medicine. Designed to operate at 100% efficiency, this air cleaner traps over 90% of the fine-dust content of the air before it even reaches the filter pads. Thus, with added filtration of the dual filter pads, plus positive oil circulation for continuous self-cleaning action, your final result is approximately 100% clean air.

Yes, Cycoil's high efficiency means healthy engines and compressors—along with healthy savings. Write for Bulletin No. 130. It gives you the complete Cycoil story right down to the last bolt and nut.

Today's Best Buy is Better Air!

AAF

American Air Filter

COMPANY, INC.

444 Central Avenue, Louisville 8, Kentucky • American Air Filter of Canada, Ltd., Montreal, P. Q.

All SHELL AND TUBE ...HEAT EXCHANGERS by Vogt

At LOUISVILLE REFINING CO.'S New CATALYTIC CRACKING PLANT

ABOVE: View of new construction at Louisville Refining Company.

BELOW: Some of the many Shell and Tube Exchangers.

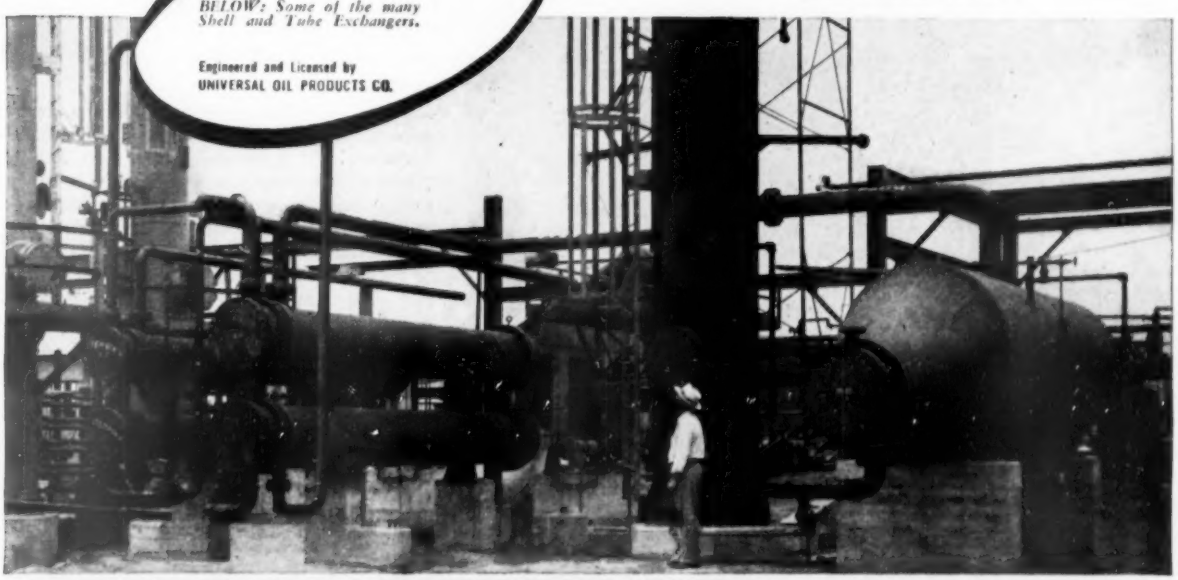
Engineered and Licensed by UNIVERSAL OIL PRODUCTS CO.

Premium gasoline production has been boosted 20% from the same amount of oil charged since the Louisville Refining Company's new Catalytic Cracking Plant went on stream.

The new plant uses Vogt Shell and Tube Heat Exchangers exclusively and they make a significant contribution to the efficient and economic operations of this progressively modern refinery.

Vogt Shell and Tube Heat Exchangers are available in many different types, with fixed or removable tube bundles, to meet the special problem and specific operating conditions of each installation. They are constructed from carbon and special steels to meet every temperature, pressure, or vacuum service requirement.

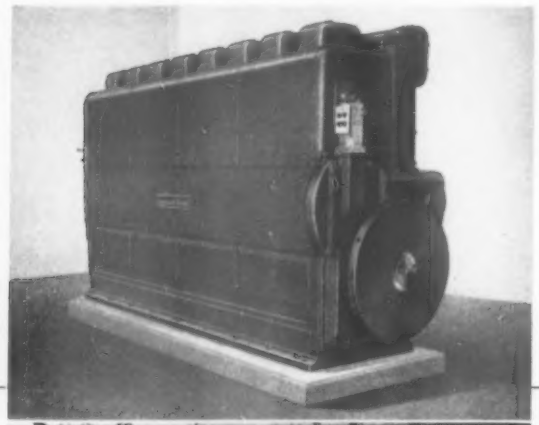
WRITE FOR BULLETIN HE-6



HENRY VOGT MACHINE CO. Louisville 10, Ky. • BRANCH OFFICES: NEW YORK, PHILADELPHIA, CHICAGO, CLEVELAND, ST. LOUIS, DALLAS, CHARLESTON, W. VA.

Heavy-Duty Diesels...

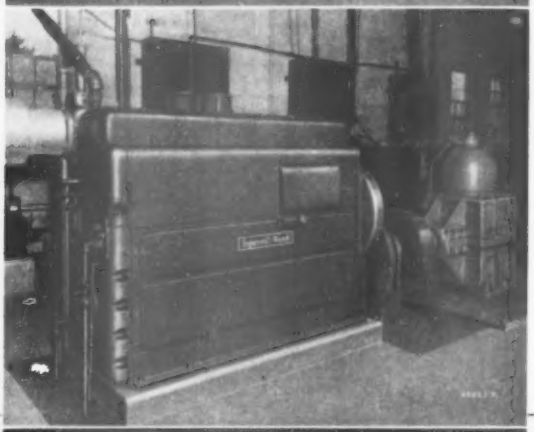
all designed for continuous full-load operation



An 8 cylinder 600 horsepower Ingersoll-Rand Type S Diesel Engine

The I-R type "S" is a 4-cycle, heavy-duty, medium-speed diesel engine with a fuel consumption of only 0.38 lbs per bhp-hr at full load. It has a bore of 10½ inches and a stroke of 12 inches. Speed is 720 rpm for driving 60-cycle generators and 750 rpm for 50-cycle and mechanical drive. It is available with 6, 7, or 8 in-line cylinders and rated at 450, 525 and 600 hp.

The type "SS" is a turbo-charged "S" and provides maximum economy of space and weight by producing more than 50 percent more power than unsupercharged engines. Available in 6, 7, and 8 sizes for 710, 825, and 945 hp.

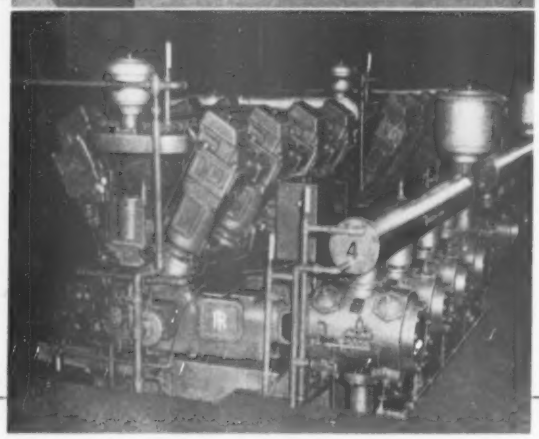


An Ingersoll-Rand 6 cylinder TS Diesel Engine driving an I-R vertical water pump through right-angle gears at a paper mill.

Ingersoll-Rand's new TS diesel engine is a smaller, lighter-weight engine built with all the longlife features, stamina and dependability of big engine design. It is 7 inch bore, 8½ inch stroke diesel with a fuel consumption of only 0.40 lbs per bhp-hr, but weighs about 30 lbs per hp.

Features include: big 5¼" crankshaft, full-floating aluminum-alloy bearings—full pressure lubrication, individual cylinder heads, replaceable liners, removable valve-seat inserts, large single-hole injection nozzles, gear-driven supercharger and many others.

Available with 6 or 8 in-line cylinders and delivering 200 to 375 continuous hp at 900-1000 rpm.



An I-R XVO Diesel-engine-driven air compressor with 8 power cylinders and 4 compressor cylinders on a construction project.

When a Diesel-powered compressor is needed, the Ingersoll-Rand "XVO" is the perfect answer; it combines a heavy-duty 4-cycle diesel engine and a heavy-duty, double-acting compressor in a single, compact machine that's easy to install and relocate. It assures a maximum compressed air output per pound of fuel. With one gallon of fuel oil, the XVO compresses 5600 cu ft of air to 100 lb pressure.

The XVO is available with compressor cylinders for any pressure or vacuum in four sizes with 2, 4, 6, or 8 diesel power cylinders rated at 66 to 280 hp.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y. 942-7

Starting Air Compressors • Hoists
Impactools • Starting Air Motors

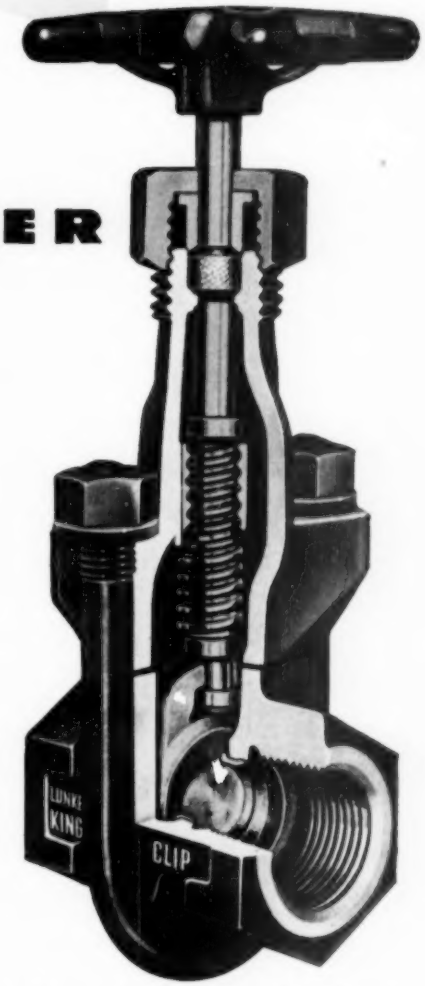
COMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO-BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • DIESEL & GAS ENGINES

Tightest gate valve . . . . . you ever used!

the original clip valve with the NEW **non-slip®** *handwheel**

King-clip®

by **LUNKENHEIMER**



It closes tight . . . it stays tight . . . and here are four good reasons why:

The new Non-Slip Handwheel provides a firmer, more comfortable grip for closing — even when the operator's hands are wet or greasy.

The body provides unusual ruggedness — protects the valve against distortion from wrenching or pipe stresses . . . and the steel clip permits quick disassembly and reassembly.

Extra thread length prevents pipe ends from jamming against diaphragm or seat rings to force them out of line. Threads accommodate both A. P. I. and standard threaded pipe.

Stemalloy* stems, in the Iron Body Bronze Mounted patterns, have amazing resistance to thread wear. Millions are in use, and *not one* has ever been returned due to wear failure.

LUNKENHEIMER
QUALITY

BRONZE IRON STEEL

Ask your Lunkenheimer Distributor about "King-clip" — the original Lunkenheimer clip valve with cast-in drain channels and a bonnet-thread bushing for perfect stem alignment. For full details, request Circular 561 from your distributor or The Lunkenheimer Company, Box 3601, Cincinnati 14, Ohio.

*Patented

LUNKENHEIMER®

THE ONE *Great* NAME IN VALVES

L-7514

Help for Oil Men on the cost sheet... and on the job

IN the past 15 to 20 years, the oil industry has kept earth-moving costs down in spite of rising labor and material costs. To do it, contractors and oil companies have pioneered new techniques that have put constantly increasing demands on earth-moving machinery. That's why in today's tough competitive era, a man needs modern equipment that gives him a versatile outfit, easy to move from job to job . . . equipment that enables him to work at a profit.

In an effort to cooperate fully to meet these demands, Allis-Chalmers has geared its progress to that of the oil man himself . . . now offers him completely new designs like the HD-15 . . . a machine that takes advantage of even the most recent developments in tractor application.

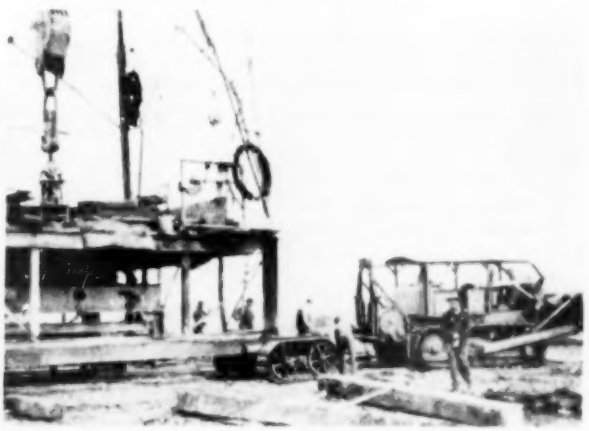
The design of the HD-15 also makes full use of new metals, new oils and greases, and the latest manufacturing processes. Existing models were not allowed to restrict Allis-Chalmers engineers...so they worked right from the ground up, matching part to part, assembly to assembly, and the entire tractor to its Allied equipment. As a result, the HD-15 offers new standards in ease of operation and service, as well as long-life performance. With outstanding balance characteristics, it handles both mounted and drawn equipment well, provides maximum flexibility for the wide variety of jobs in today's oil field work.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

HD-15
109 drawbar hp.
27,850 lb.
Six speeds forward to 5.8 mph.
Three reverse speeds to 4.5 mph.

Constant progress in earth-moving methods has been matched by such design advances as this HD-15 and its engine-mounted dozer . . . which were engineered and tested as a unit, right from the start.

This HD-15 Tractor Shovel is a tool which introduced a new era of tractor usefulness . . . let contractors move from job to job easily and do traditional jobs in a better, faster way.



The improvements and refinements of this really modern design take on new significance as competition gets keener. Extra jobs handled . . . or lubrication time saved means working more efficiently, more profitably.

AEROCAT®

MS SYNTHETIC CRACKING CATALYST

Among the 97 fluid cat cracking units in operation in the U. S. during 1953, some 65 used AEROCAT MS Synthetic Cracking Catalyst—for three reasons.

First, because AEROCAT is the surest, most economical means to:

- ★ high octanes
- ★ high throughput
- ★ low CO_2/CO ratio in flue gas
- ★ high iso butane yield
- ★ excellent heat, steam and sulfur stability

Second, because Cyanamid – producer of AEROCAT and pioneer in microspheroidal catalysts – has the research facilities, the technical service staff, *and the experience* required to develop solutions to individual application problems.

Third, because Cyanamid can be relied upon as a source of supply.

If you're not already a user of AEROCAT (chances are 2 out of 3 that you are), contact your Cyanamid Technical Service representative soon. He'll be happy to help you secure the economy and efficiency of AEROCAT in your cracking operation.

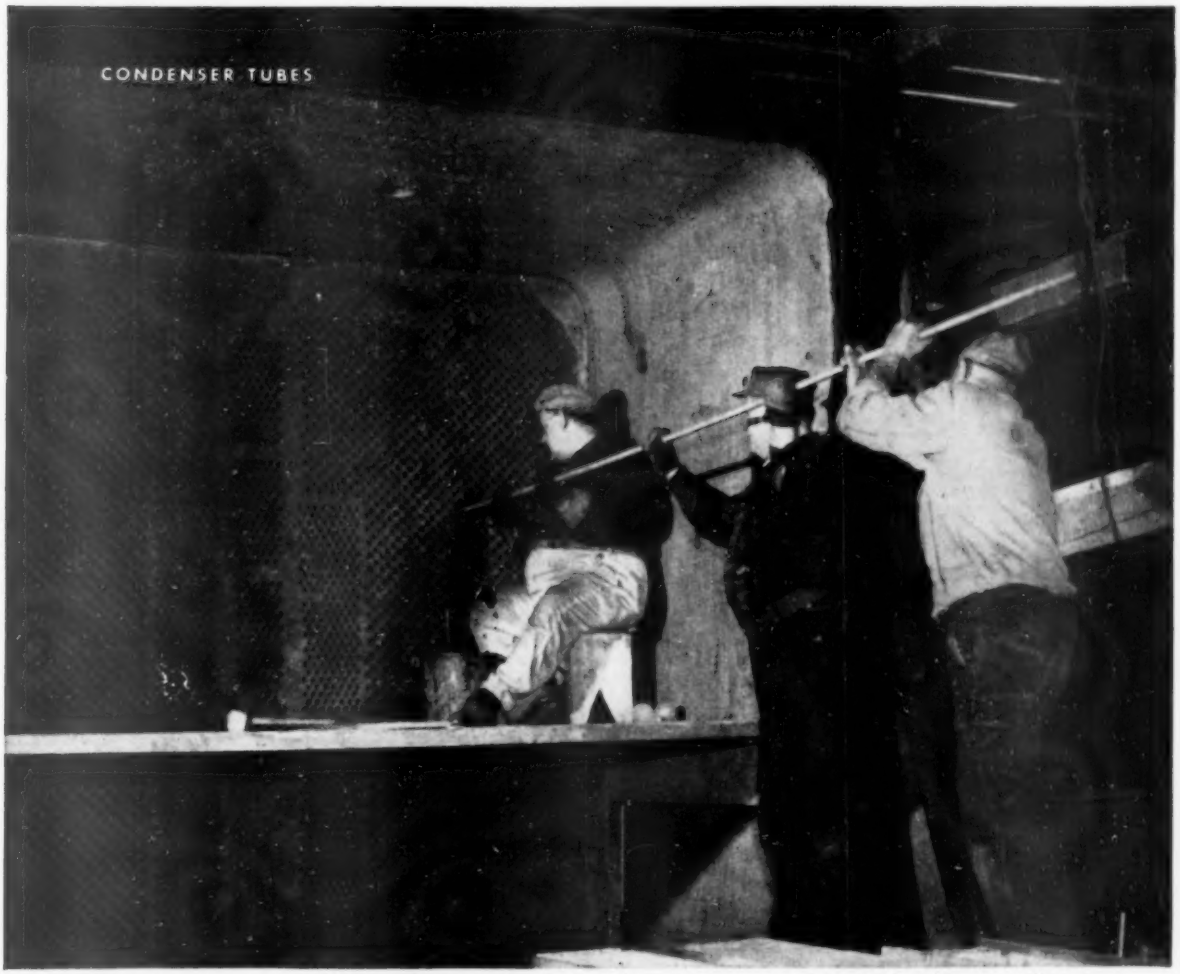
And among those who use synthetic catalyst, more than 8 out of 10 use AEROCAT.

AMERICAN Cyanamid COMPANY

REFINERY CHEMICALS DEPARTMENT

30 Rockefeller Plaza, New York 20, N.Y.

In Canada: North American Cyanamid Limited, Toronto and Montreal



HERE'S ONE of more than 6260 ANACONDA Ambraloy-927* Tubes going into Consolidated Edison's new condenser.

Con Edison chooses Aluminum Brass for condenser tubes in new power plant

The Consolidated Edison Company's new power plant in Astoria, N. Y., will house 6 generating units. Unit #2, having a 160,000-kw generator, will be put on the line in the Spring of 1954. The condenser serving this unit has cooling surface area of 105,000 sq. ft. Tubes—15,450 of them—are Aluminum Brass, ¾" O.D., #18BWG, 30 ft. long. About half were supplied by Anaconda.

LOCATED IN ASTORIA, QUEENS, on the East River, Con Edison's new plant will mean better-than-ever electrical service for New York City.

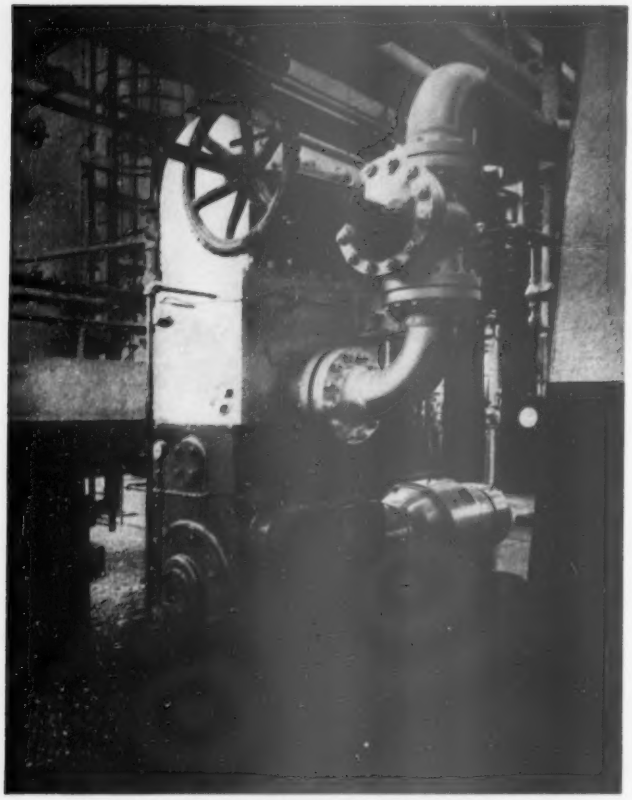
ANACONDA Ambraloy-927* (aluminum brass) is one of the most durable tube alloys available at a moderate cost. It gives excellent service in both clean and polluted sea water and has largely replaced Admiralty along the U. S. seacoast. It is used not only in main condensers, but also in auxiliary coolers for lubricating oil, transformer oil, hydrogen and air.

Anaconda supplies Con Edison — which insists upon the best equipment available — with condenser tubes and tube sheets for many of their power plants. Whatever alloy best fits *your* operating needs, choose it from the extensive line of ANACONDA Alloys for tube and tube sheets. Our Technical Department will be glad to analyze your tube performance problems at no cost. Free Publication B-2, "ANACONDA Tubes and Plates for Condensers and Heat Exchangers," will be sent on request. Write: *The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.* 5312

*U.S. Patent No. 2,005,685 (ORIG.)

ANACONDA®

Tubes and plates for condensers and heat exchangers • welding rods • American Flexible Metal Hose and Tubing • American Vibration Eliminators



WORTHINGTON POWER PUMP handles light hydrocarbons at Indiana refinery. Close-clearance liquid end makes this pump a natural for handling propane, butane, and other volatile fluids

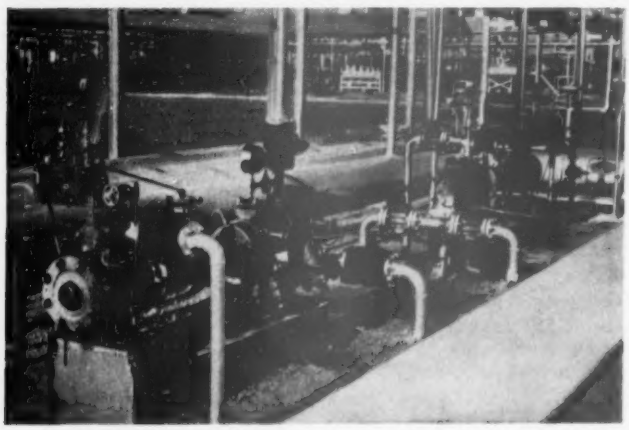
Power pump?
Steam pump?
Rotary pump?

You name it... we make it!

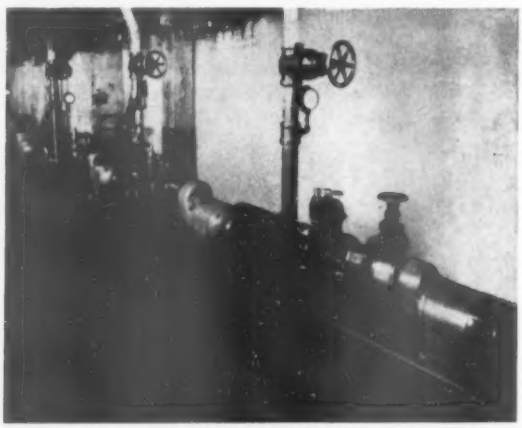
• When you're in the market for a pump, it stands to reason that you'll do better by going to a pump specialist. And that's exactly what Worthington has been since 1840.

Because we make all types of pumps–in thousands of different sizes—we're able to give an unbiased, objective opinion about any and all of your pump needs. No matter what your pressure requirements or type of power available, there's a Worthington pump that will suit your application exactly.

Write and tell us about your pumping problems. Be sure to give all pertinent details. Drop a line to your nearest Worthington district office or write directly to Worthington Corporation, Reciprocating Pump Division, Section P.3.2, Harrison, New Jersey. P.3.2



WORTHINGTON STEAM PUMPS pick up condensate from scrubbers for this petroleum company in Oklahoma. These units are part of Worthington's HiVol line—pumps specially designed to handle highly volatile liquids with high volumetric efficiency



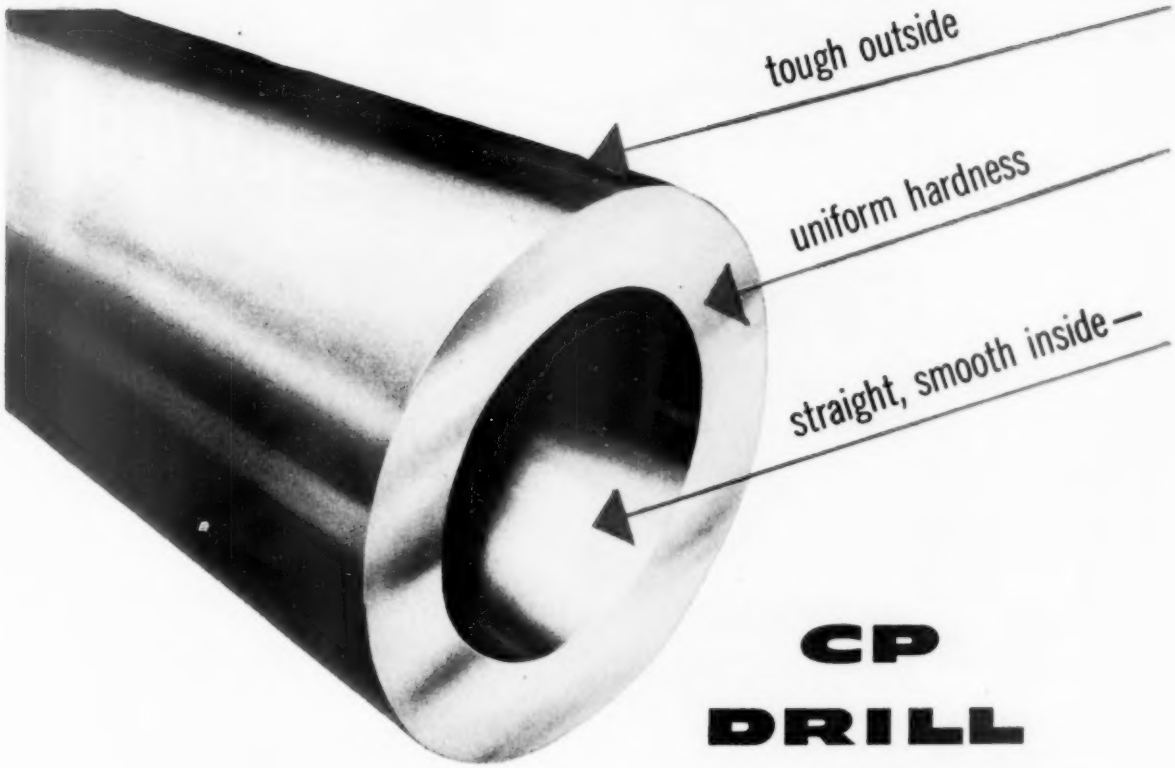
WORTHINGTON ROTARY PUMPS at this oil company plant in Pennsylvania are used for filling cans with motor oil of various viscosities. Every Worthington rotary pump is completely tested on oil before being put in stock.

MEMBER

WORTHINGTON

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB

Centrifugal • Rotary • Steam • Power • Vertical Turbine



CP DRILL COLLARS

The straight smooth inside bore of all CP Drill Collars eliminates harmful offsets and washouts. CP's special heat treating and boring processes assure uniform, wall-to-wall hardness and precisioned straightness at all sections. Uniform wall thickness assures proper balance to minimize warping and whipping.

All threads are hobbed to maintain accurate thread form. Collars are available in lengths up to 55 feet.

For complete information, write Chicago Pneumatic Tool Company, Oil Tool Division, 1 N.W. 16th Street, Oklahoma City, Oklahoma.

Chicago Pneumatic

IN CANADA: 10103 81st Ave., So. Edmonton, Alberta, Canada. • IN MEXICO: Mexico, D. F., Rosas Moreno No. 41; Tampico, Pamps., Apartado No. 174.
• SPECIAL OIL TOOL EXPORT AGENT: E. F. Gahan, Inc., 500 Fifth Ave., New York 17, N. Y. (West Indies, Central and South America, exclusive of Mexico.)

THIS NEW AUTHORITATIVE GUIDE TO PIPING MOTION CONTROL SHOULD BE AN IMPORTANT PART OF YOUR BASIC ENGINEERING FILE

The New FLEXON Expansion Joint Design Guide

THE FLEXON EXPANSION JOINT LINE-UP

Flexonics Corporation manufactures a complete line of corrugated type stainless steel and copper expansion joints in Free-Flexing (low pressure), Controlled-Flexing (high pressure) and Flexoniflex (extremely high pressure) units. Sizes range from ½" to 48". Units are available for temperatures from —400° F., to 1600° F., and for pressures from vacuum to 5500 psi. Write for further information or see the Flexonics catalogs in Sweet's Plant Engineering File, Chemical Engineering Catalog or The Refinery Catalog.

Now at last, comprehensive, up-to-date information on the absorption of motion in piping has been gathered together in one easy-to-use booklet. In its new Expansion Joint Design Guide, Flexonics Corporation offers an authoritative handbook of piping design and layout! Included in the booklet are thorough discussions of types of motion, design considerations pertaining to the physical characteristics of expansion joints and anchoring and guiding, typical piping layouts, computation of thermal expansion, safety factors and many other vitally important factors in piping design.

Much of the information presented is available nowhere else; all of it helpful to anyone responsible for the design, installation or maintenance of piping. Copies of the Flexon Expansion Joint Design Guide are available without charge. Write for your copy, today.

Flexonics *Corporation*

EXPANSION JOINT DIVISION
1345 S. THIRD AVENUE · MAYWOOD, ILLINOIS

FORMERLY CHICAGO METAL HOSE CORPORATION
In Canada: Flexonics Corporation of Canada, Ltd., Brampton, Ontario

Flexon identifies products of Flexonics Corporation that have served industry for over 50 years.

Flexible metal hose

Expansion joints

Aircraft components

Metallic bellows

dependable carrying capacity

RAYMOND
CONCRETE PILE CO.
RAYMOND
J-8057-C
JULY 9, 1953
STEP TAPER TEST PILE
BY RAYMOND CONCRETE PILE CO.
FOR NEW YORK LIFE INSURANCE CO's
LAKE MEADOWS HOUSING PROJECT
... MAIN BOILER PLANT ...
33rd & RHODES CHICAGO, ILLINOIS
LENGTH 36 FEET ... NET SETTLEMENT 1/8 INCH
TOTAL LOAD-100 TONS
ARCHITECT - SKIDMORE, OWINGS & MERRILL
GENL' CONTR. - TURNER CONSTRUCTION CO.

* **ADVANTAGES OF RAYMOND CONCRETE PILES...**

Number two of a series

A LOAD OF 100 TONS was applied to a Raymond Step-Taper Pile at the Lake Meadows Housing Project, Chicago. The net settlement was 1/8 inch—another proof of the dependable carrying capacity of Raymond Concrete Piles. Reasons for this Raymond reliability are the use of proper equipment which permits driving to the specified resistance . . . elimination of pile distortion by external pressure because of the steel shell which remains in place . . . maintenance of soil pressure developed in driving . . . and ease of inspection after driving to insure a perfect pile from point to cutoff.

RAYMOND

CONCRETE PILE CO.

140 CEDAR STREET • NEW YORK 6, N. Y.

Branch Offices in Principal Cities of the United States, Central and South America

RAYMOND'S DOMESTIC SERVICES
Soil Investigations • Foundation Construction
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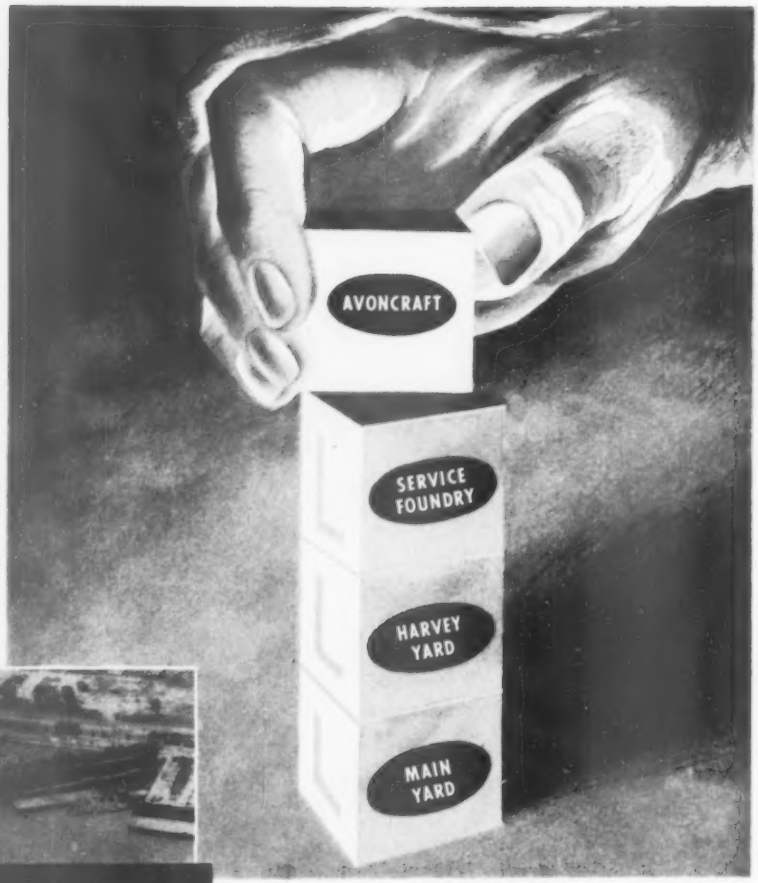
RAYMOND'S SERVICES ABROAD In addition to the above, all types of General Construction.

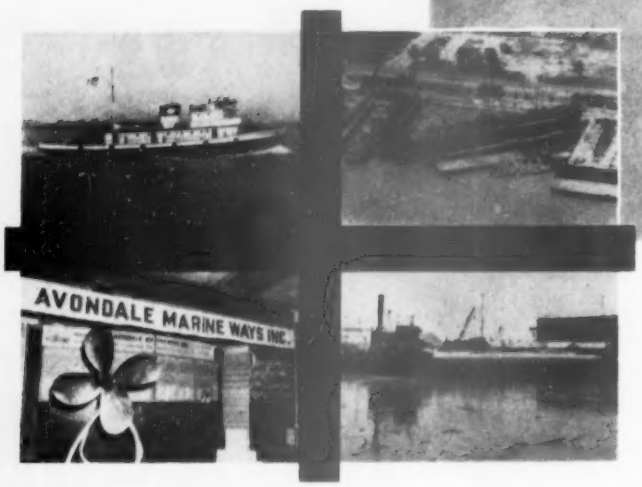
AVONDALE ADDS A 4th DIVISION

4 complete facilities for a well rounded service

Now . . . Avondale adds a 4th Division to its already-famous industrial trio. The new Avoncraft Division will manufacture one of the most recent and widely accepted building materials, architectural porcelain enamel on steel, in the form of load-bearing walls, load-span decking and curtain walls for exterior or interior building uses. The new plant will be located at Avondale, La. and production on a volume basis will begin about January, 1954.

Avondale's 4 big facilities will continue to serve the needs of the Maritime Industry . . . each and every one offering the type of Service that has made the name, Avondale, famous . .





***MAIN YARD** • Avondale, La. Ship and barge building and repairs, tank cleaning and steel fabrication.*

***HARVEY YARD** • Harvey, La. Quick repairs, dry-docking, and propeller service.*

***SERVICE FOUNDRY** • New Orleans, La. Iron, steel and non-ferrous castings, cut gears, and large capacity machine work.*

***AVONCRAFT DIVISION** • Architectural porcelain enamel on steel load-bearing walls, load-span decking and curtain walls.*

Service • Integrity • Efficiency

SHIP BUILDING • SHIP REPAIRING • FOUNDERS • PROPELLERS • STRUCTURAL STEEL

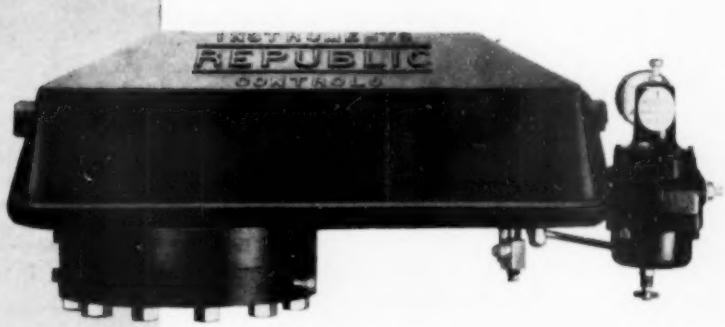
AVONDALE MARINE WAYS, INC. CABLE ADDRESS "AVONWAYS"

P. O. BOX 1030 • PHONE UNiversity 4561 • NEW ORLEANS 8, U. S. A.

COMBINES MACHINE RUGGEDNESS WITH INSTRUMENT PRECISION for dependable low maintenance metering

REPUBLIC

pneumatic transmitter for measuring FLOW, PRESSURE, LEVEL or DENSITY...



Machine dependability with instrument accuracy and sensitivity! Think what this combination of features can mean in your plant—less maintenance, longer life for lowest "long run" cost, *continuous* accurate operation.

You get all of these benefits and more with the Republic Pneumatic Transmitter. Force-balance operation permits the use of strong rugged parts with no sacrifice in accuracy or sensitivity. Gives exceptional overrange protection.

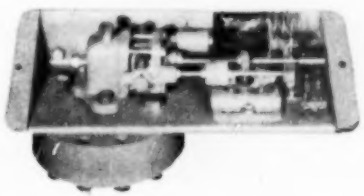
Housed in a durable metal case, the transmitter may be adjusted for mounting at any angle, indoors or out. Its accuracy is not affected by changes in ambient temperature vibration, normal changes in supply air pressure or inaccurate leveling. Uses no mercury or purge pots. Can be used with very viscous fluids.

The Republic transmitter isolates fluids to a measuring chamber which may be supplied in a variety of corrosion resistant materials. It sends an air pressure proportional to fluid flow, pressure, level or density to reading instruments or for actuation of an automatic controller.

Republic Pneumatic Transmitters are proving their superiority in hundreds of chemical and oil field applications. Investigate their advantages for you — write for your free copy of 36 page Data Book No. 1004.

SPECIFICATIONS:

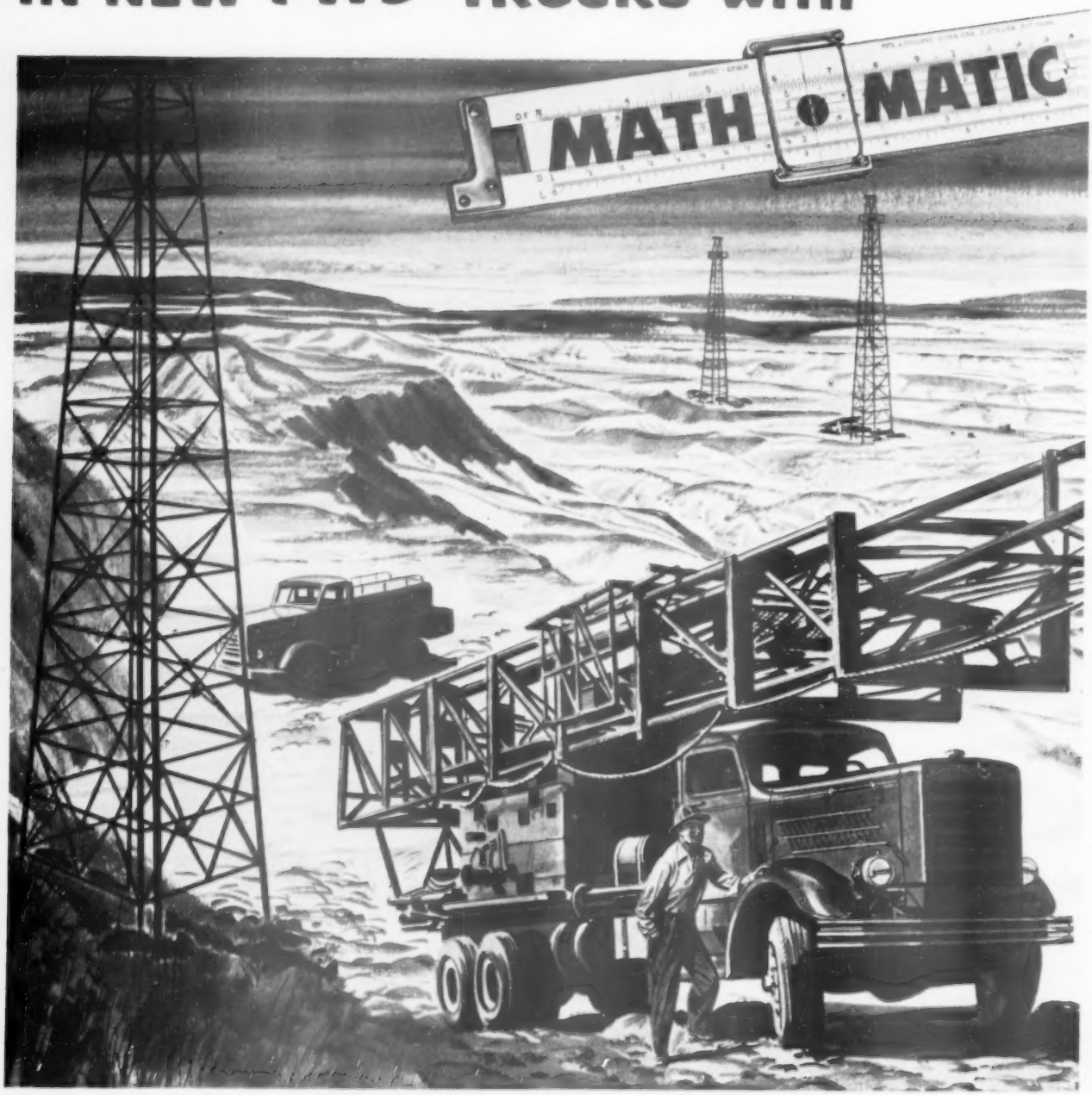
ACCURACY — ½% of maximum range guaranteed for standard models.
DIFFERENTIAL RANGES — Any desired span between 0-0.6" H_2O and 0-750 psi at operating pressures of 15 psig to 2000 psig.
PRESSURE RANGES — Any desired span between 0-1" H_2O and 0-2000 psig.
LEVEL RANGES — to meet almost any application.
DENSITY RANGES — 0.15 sp. gravity spread for 3 to 15 psig output pressure from any base density.
Extremely wide range change is possible without change of parts. Ranges may be easily changed, suppressed, compounded or reversed.



● ***EASILY SERVICED*** Cover can be completely removed for access to all range adjustments and replaceable parts. No special tools required.

REPUBLIC FLOW METERS CO.
2240 Diversey Parkway, Chicago 47, Illinois

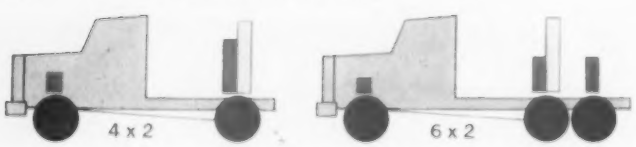
MORE OF THE WEIGHT IS "WORKING" IN NEW FWD TRUCKS with



W Proportion of weight on each axle

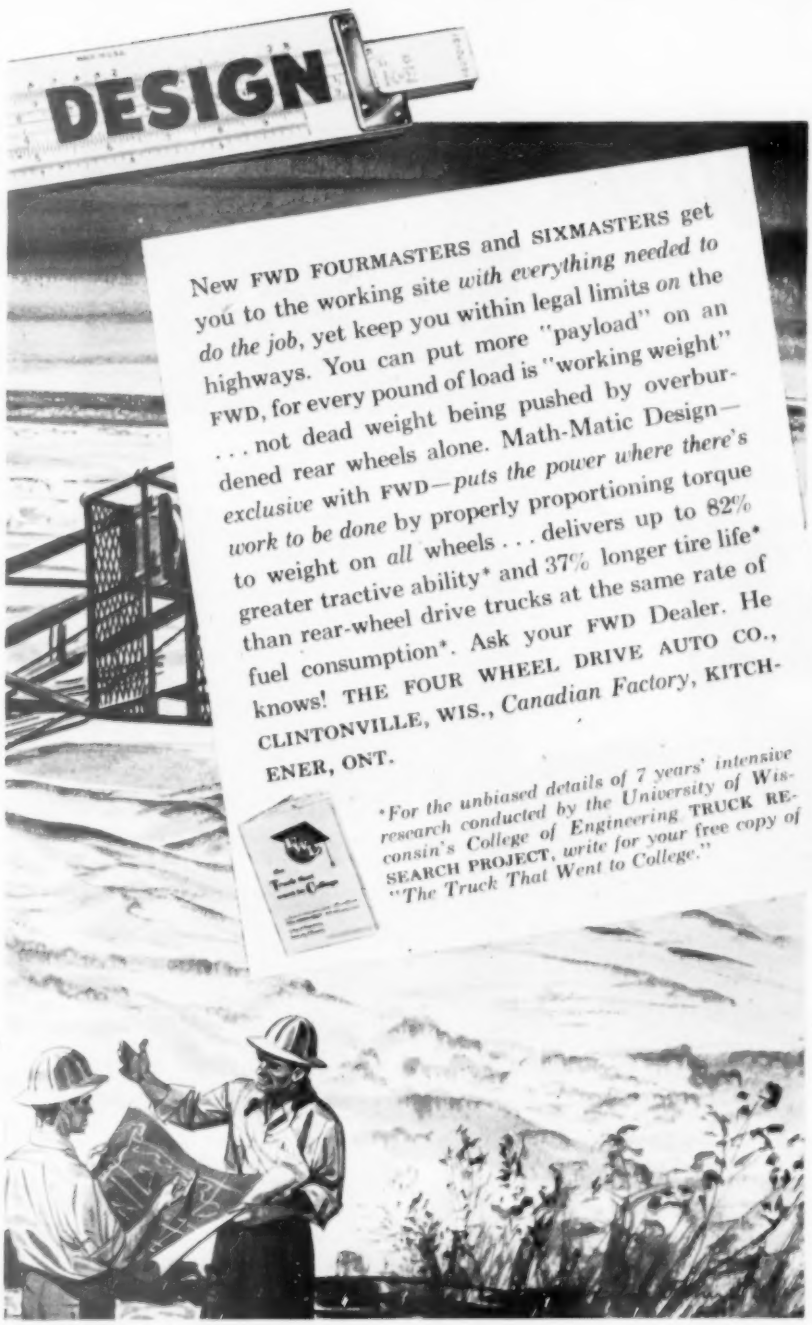
P Proportion of power on each axle

THESE DIAGRAMS SHOW THE WASTEFUL IMBALANCE OF POWER TO VEHICLE LOAD IN ORDINARY REAR-WHEEL-DRIVE TRUCKS.



THESE DIAGRAMS SHOW THE PROPER PROPORTIONING OF TORQUE TO WEIGHT, AVAILABLE ONLY IN FWDs WITH MATH-MATIC DESIGN.

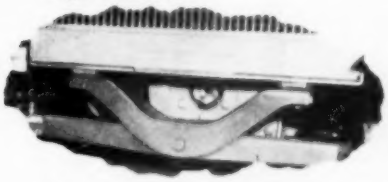
WEIGHT"



New FWD FOURMASTERS and SIXMASTERS get you to the working site *with everything needed to do the job*, yet keep you within legal limits *on* the highways. You can put more "payload" on an FWD, for every pound of load is "working weight" . . . not dead weight being pushed by overburdened rear wheels alone. Math-Matic Design—*exclusive* with FWD—*puts the power where there's work to be done* by properly proportioning torque to weight on *all* wheels . . . delivers up to 82%* greater tractive ability* and 37% longer tire life* than rear-wheel drive trucks at the same rate of fuel consumption*. Ask your FWD Dealer. He knows! THE FOUR WHEEL DRIVE AUTO CO., CLINTONVILLE, WIS., *Canadian Factory*, KITCHENER, ONT.

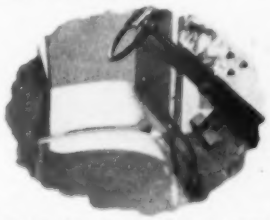
**For the unbiased details of 7 years' intensive research conducted by the University of Wisconsin's College of Engineering* TRUCK RESEARCH PROJECT, *write for your free copy of "The Truck That Went to College."*

FUNCTION-ALL STYLING . . . Clutter-free efficiency from front to back; no "tinwork" or jutting drive line components to interfere with mounting of winches, tanks, derricks and other equipment. *Snub-Nosed Front End* gives FWD advantages in meeting state laws regulating weight by axle-to-front-end, overall length dimension.

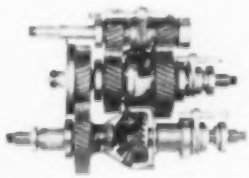


TRUNION-MOUNTED RADIATOR . . . Rubber-mounted floating trunion construction isolates hood, core and shell from frame, cushions even the hardest shocks.

NEW "20" SERIES REAR AXLE . . . For the 22,000 to 28,000 G.V.W. FOURMASTERS and the 30,000 to 40,000 G.V.W. SIXMASTERS, this full-floating axle has a 30% stronger shaft and heavier housing, ring gear, pinion and differential assembly.



IMPROVED ALL-STEEL SAFETY CAB . . . 3-man coupe type, a full 70" wide. Adjustable seat, picture-window visibility and lots of leg room. Rubber-mounted cab with *Improved Twin-Pivot Support* cushions off-the-highway shocks and stresses. *Suspended, Cab-Mounted Foot Pedals, Armored Outside Step-Up Fuel Tank, 12-Volt Electric System.*



THE HEART OF MATH-MATIC DESIGN . . . The precision-engineered gear ratio of this center differential assembly properly proportions power to weight on all wheels. Factory-installed, in your choice of 1:1, 1:1.5 or 1:2.5 power ratios. *Power-Operated Center Differential Lock* eliminates inter-axle compensation when desired. Manually controlled but power actuated. Red dashboard light warns when lock is on.

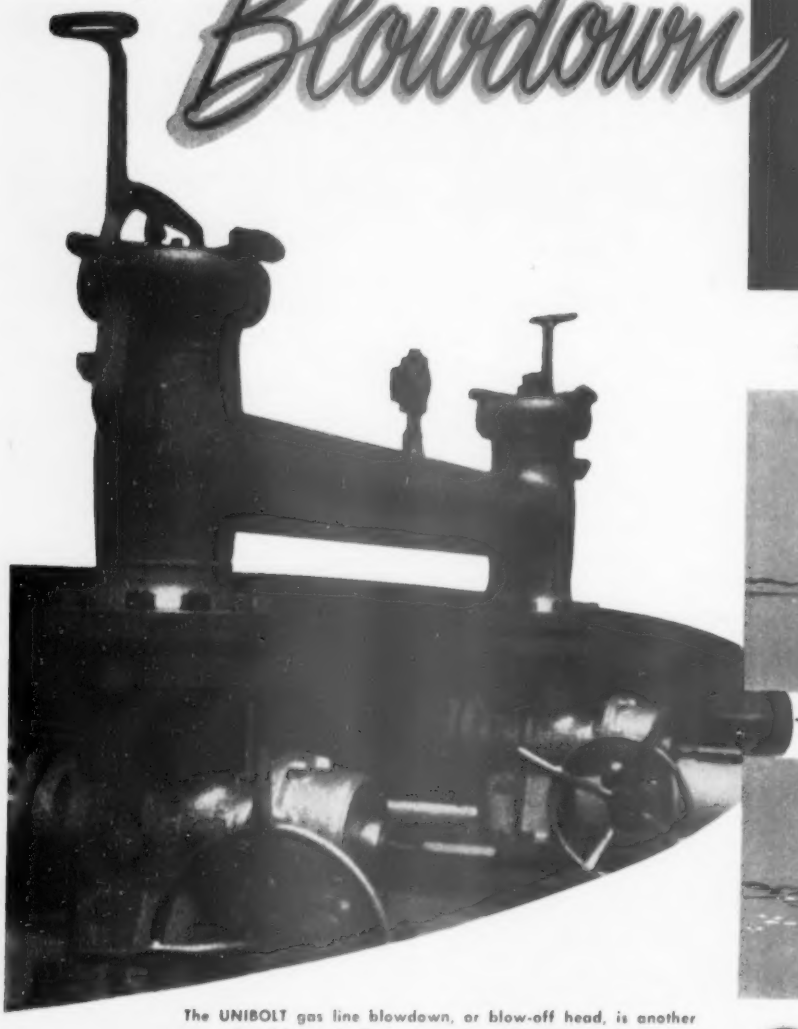
AMERICA'S FOREMOST HEAVY DUTY TRUCK

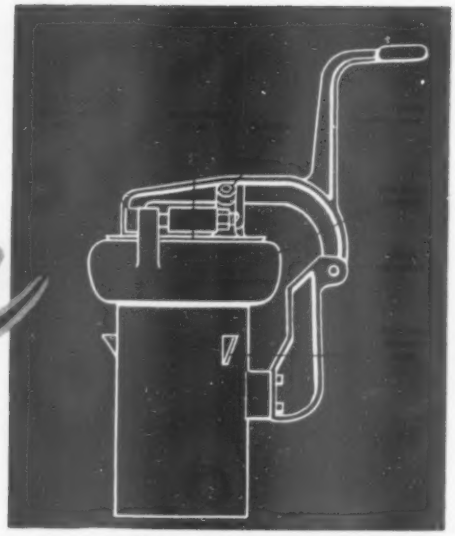
FWD

MATH-MATIC DESIGN

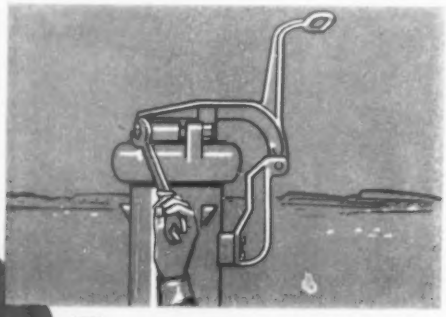
The "Lowdown" on the new Unibolt gas line

Blowdown

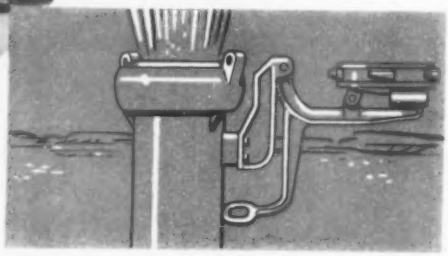




Release only two bolts and rotate the nut member slightly to disengage the tapered interlocking shelves.



A lever lifts the hinged blanking plug off and out of the way.



The self-sealing gasket is shown in cross-section at left. Note the lipped design of the gasket which makes it self-sealing under line pressure.

The UNIBOLT gas line blowdown, or blow-off head, is another example of how pipeliners are using UNIBOLT Couplings with Blanking Plugs to take the place of troublesome, time-consuming, multi-bolt blind flanges. Like the UNIBOLT Hinged Scraper Traps, and closures for terminal manifolds, scrubbers, strainers and other large diameter pressure vessels, the blowdown is designed to provide a safe, pressure-tight, convenient means of blanking-off. A bleeder plug in the cap is provided to relieve any pressure that might leak through the riser valve.

See your Composite Catalog for complete details, or literature will be sent gladly on request.

UNIBOLT

P. O. BOX 1184 HOUSTON, TEXAS

GROWING

STATEMENT OF CONDITION

At the Close of Business December 31, 1953

ASSETS

Cash on Hand and Due from Banks		$255,446,202.86
United States Government Obligations	$110,988,559.03	
Public Housing Authority Obligations (Fully Guaranteed)	12,975,830.31	
State, County and Municipal Bonds	13,373,910.48	137,338,299.82
Stock in Federal Reserve Bank		900,000.00
Other Bonds		219,098.00
Commodity Credit Corporation Certificates and Notes		22,287,142.32
Loans and Discounts		218,006,983.66
Income Accrued		1,483,209.60
Letters of Credit and Acceptances		3,130,333.37
Banking House and Equipment		7,257,013.95
Other Assets		93,864.34
		$646,162,147.92

LIABILITIES

Capital Stock	$15,000,000.00	
Surplus Fund	15,000,000.00	
Undivided Profits	4,897,107.54	$ 34,897,107.54
Reserve for Contingencies		2,802,369.60
Reserve for Taxes, Etc.		3,347,887.55
Deferred Income		470,898.91
Letters of Credit and Acceptances		3,130,333.37
DEPOSITS:		
Individual	$352,811,749.46	
Banks	234,509,119.03	
U. S. Government	14,192,682.46	601,513,550.95
		$646,162,147.92

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The major difference between banks of today is the way people are treated.

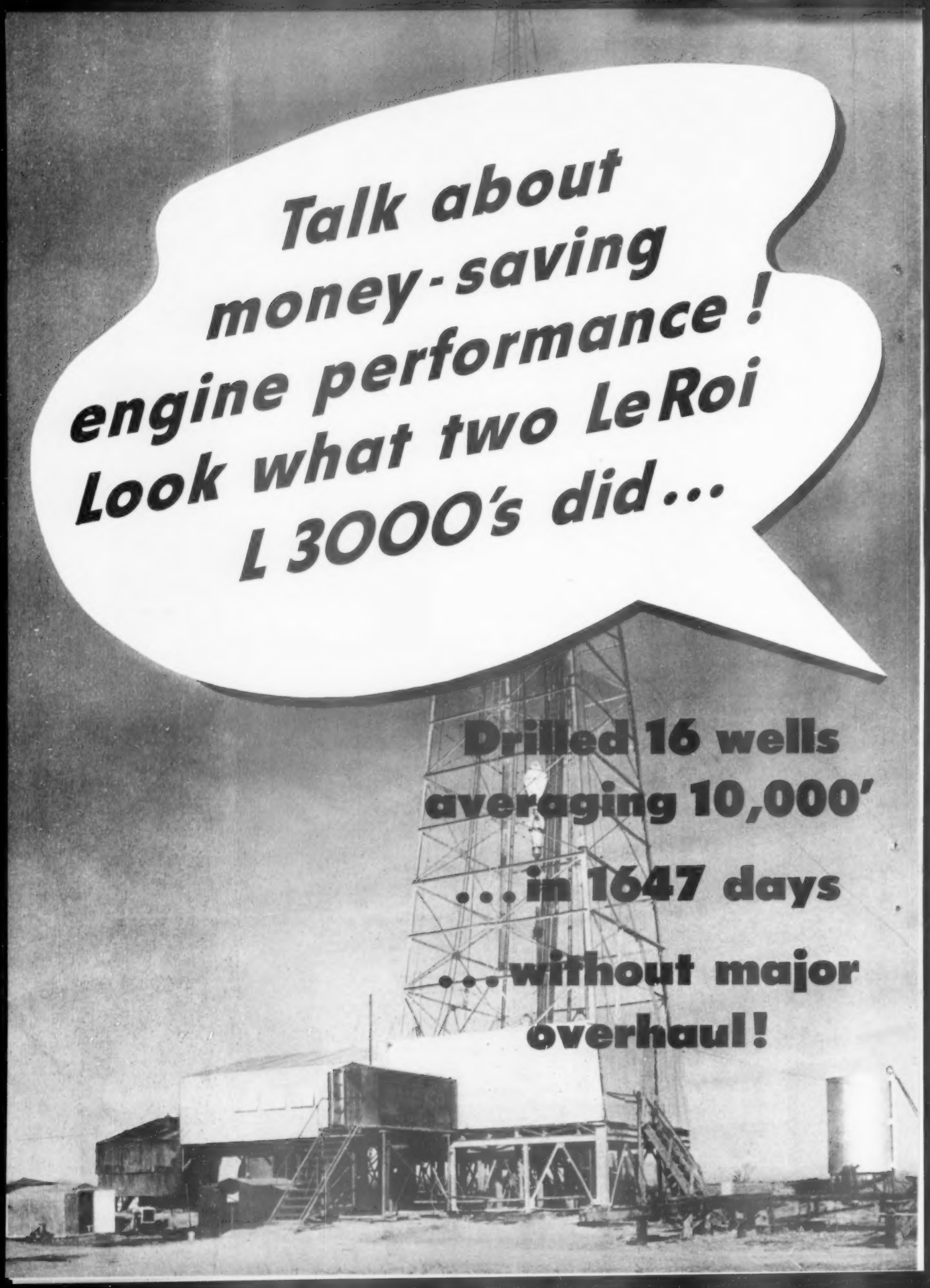
Ben Wooten
PRESIDENT

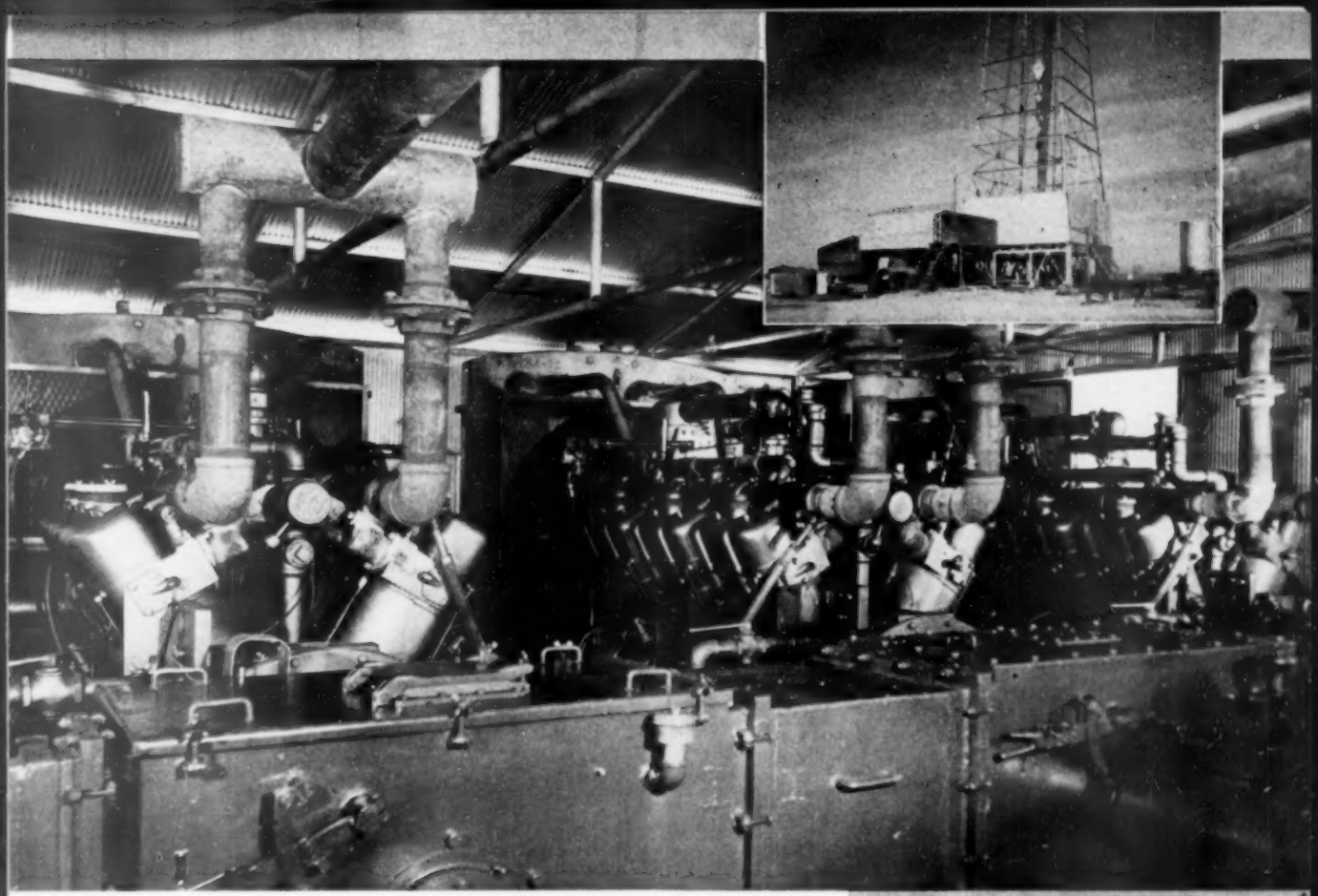
1st

78th year of dependable personal service

NATIONAL BANK IN DALLAS

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION


Talk about money-saving engine performance! Look what two LeRoi L 3000's did...
Drilled 16 wells averaging 10,000'
...in 1647 days
...without major overhaul!



ALMOST 5 years of drilling service — with but very little repair work and only an occasional top overhaul! That's real performance — the kind of performance two Le Roi L3000's gave Trigg Drilling Company of Oklahoma City.

And — they delivered the power, the fast acceleration, the vibration-free operation Le Roi engines have long been famous for. Thanks to this exceptional power and smoothness, they handled 15,000 feet of 4½" drill pipe easily, according to Mr. Clay Trigg.

It's no wonder Trigg Drilling Company selected Le Roi to power the three-engine rig shown above. It's no wonder they now have a total of seven L3000's on their three rigs and an additional two Le Roi H2000's.

Reports from all fields show that you can count on Le Roi for dependability and economy under continuous loads. You can count on Le Roi for lugging power at slow speeds. You can count on Le Roi for plenty of reserve power to help your crew out of the tight spots.

Enjoy these advantages — insist on Le Roi power on original equipment and as replacement engines. Ask your rig manufacturer, supply house, or Le Roi distributor to show you Le Roi engines at work.

LE ROI

LE ROI COMPANY

A Subsidiary of Westinghouse Air Brake Co.

MILWAUKEE 14, WISCONSIN

Plants: Milwaukee • Cleveland • Greenwich, Ohio

Oil Field Headquarters: Tulsa, Oklahoma

P-819

Service as Near as Your Telephone

Complete parts stocks . . . Skilled mechanics on 24-hour call . . . Unexcelled overhaul facilities

Oilfield Sales-Service Network

Oklahoma
Le Roi Company Branch — Tulsa.
Carson Machine & Supply Co. — Oklahoma City.

East & South Texas, Gulf Coast
Southern Engine and Pump Company — Houston, Kilgore, Edinburg, Dallas, San Antonio, Corpus Christi, Texas, and Lafayette, Houma, New Orleans, Louisiana.

North & West Texas, New Mexico
General Machine & Supply Co. — Odessa, Snyder, Texas.
Nortex Engine & Equipment Co. — Wichita Falls, Texas.

Kansas
Carson Machine and Supply Co. — Great Bend.

Michigan
Hafer Engine Service — Reed City.

Rocky Mountain Area
Gehring Equipment Co. — Casper, Wyoming, Rangely, Col.

Mississippi, Arkansas and Northern Louisiana
Ingersoll Corporation — Shreveport, Louisiana, El Dorado, Arkansas and Clarksdale, Jackson, Mississippi.

West Coast
Le Roi Engine Sales Co. — Long Beach, California.

Appalachian Area
P. C. McKenzie Co., Pittsburgh, Bradford.

Canada
Lacey Export Ltd. — Calgary, Edmonton, Alberta.

Bitumastic Enamel being machine-applied to a section of "The Biggest Inch."

"The Biggest Inch" gets the best barrier against corrosion—BITUMASTIC ENAMEL

• "The Biggest Inch" was recently completed in Texas. 465 miles long, this pipe line is one of the largest single carriers of crude oil in the United States. A river of oil rolls through this 26-inch line at the rate of 301,000 barrels daily.

Exterior surfaces of this steel line are protected against corrosion by Bitumastic® Enamel—a protective coating that has *proved* its worth. Many oil and gas pipe lines, protected by Bitumastic Enamel 20 and 30 years ago, are still in excellent condition today.

There are many properties that make Bitumastic Enamel the best barrier against corrosion. Here are some: 1) High resistance to water; 2) High electrical resistance; 3) High resistance to soil chemicals; 4) Stability under soil stress; 5) Lasting ductility.

Whether you're interested in protecting large or small lines, oil or gas lines, it will pay you to specify Bitumastic Enamel. Get in touch with one of the offices listed below. Our representative will be glad to tell you all about Bitumastic Enamel.

BITUMASTIC 100TH Anniversary PROTECTION 1854 1954

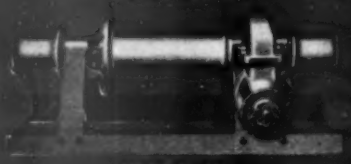
KOPPERS BITUMASTIC ENAMELS ®

KOPPERS COMPANY, INC., Tar Products Division, Dept. 103-T, Pittsburgh 19, Pennsylvania

DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.

TULSA* WINCHES

MODEL 10
¾ and 1-ton Trucks
8000 lbs. Capacity

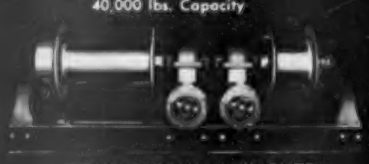


MODEL 19
1½ and 2-ton Trucks
15,000 lbs. Capacity

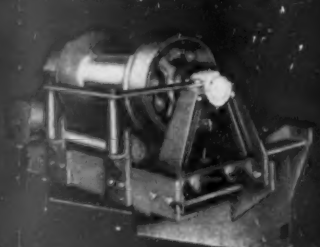
MODELS 12 — 18 — 24
Underslung for ¾ to 3-ton Trucks
8000, 15,000, 30,000 lbs. Capacities

MODEL 34
2 and 3-ton Trucks
30,000 lbs. Capacity

MODEL 64
3 and 4-ton Trucks
40,000 lbs. Capacity



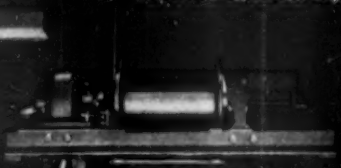
DOUBLE DRUM WINCHES
8000 to 40,000 lbs. Capacities



TULSA TRACTOR WINCHES
For Crawler Tractors
18,000 to 80,000 lbs. Capacities

MODELS 3F10 and 3F23
Friction Clutch Winches
7000 and 18,000 lbs. Capacities

MODELS 12-G and 18-G
For Front mounting on Trucks
6500 and 15,000 lbs. Capacities



MODEL 12-CH
For Dodge Powerwagons
6500 lbs. Capacity

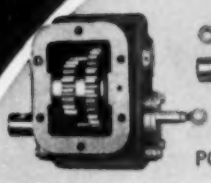
MODELS 21 and 23
1½ and 2-ton Trucks
15,000 and 18,000 lbs. Capacities

MODELS 65 and 70
3 and 4-ton — 4-ton and larger Trucks
40,000 and 60,000 lbs. Capacities

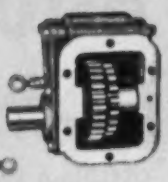
SPEED REDUCERS
15 Models available in a variety of capacities

MODEL 80
6-ton Trucks and larger
80,000 lbs. Capacity

PUBLIC UTILITY
Extended drum shaft
8000 to 30,000 lbs. Capacities

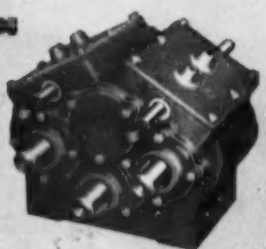


POWER TAKE-OFF
2 forward, 1 reverse speed



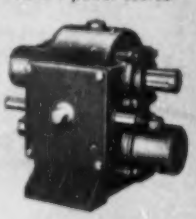
POWER TAKE-OFF
1 forward, 1 reverse speed

POWER TAKE-OFF
1 speed, heavy duty



POWER DIVIDER
Independent Powering of 2 units from 1 power source

DOUBLE END HANGER BEARING
Dual extended shaft mounted on taper roller bearings



TWO SPEED HANGER BEARING
2 output speeds for 1 input speed

Tulsa* Winch
TULSA, OKLAHOMA
DIVISION OF VICKERS Inc.

Capacity — Refers to Safe Working Ratings

*Reg. U. S. Pat. Off.

MINNEAPOLIS-MOLINE
MODERN MACHINERY

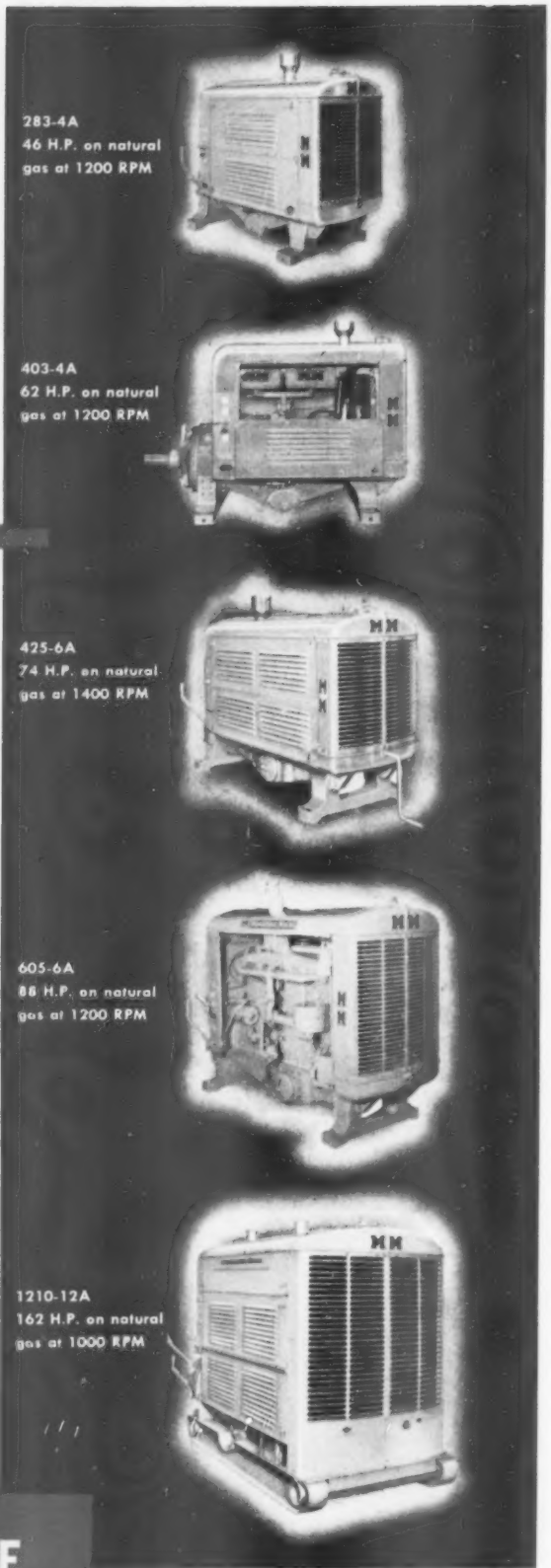
announces the NEW 800-6A ENGINE to offer wider hp range

DESIGNED TO RUN A FULL YEAR WITHOUT SERVICE

Engineered! Tested! Proved! That's the new MM 800-6A Engine, the power unit that fits perfectly into the MM line of engines which are setting new performance standards throughout the oil industry.

800-6A
129 H.P. on natural gas at 1200 RPM

THE NEW 800-6A FITS HERE IN THE MM LINE



283-4A
46 H.P. on natural gas at 1200 RPM

403-4A
62 H.P. on natural gas at 1200 RPM

425-6A
74 H.P. on natural gas at 1400 RPM

605-6A
86 H.P. on natural gas at 1200 RPM

1210-12A
162 H.P. on natural gas at 1000 RPM

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SHRIMPTON MANUFACTURING & SUPPLY CO.

LOS ANGELES Tel: RAymond 3-6549 • OKLAHOMA CITY Tel: 33284 • KILGORE Tel: 1241

ODESSA, TEXAS Tel: 7-4088

MINNEAPOLIS-MOLINE
MINNEAPOLIS 1, MINNESOTA

Your TIME SAVER

A SERVICE OF **THE OIL AND GAS JOURNAL**
FOR THE CONVENIENCE OF OUR READERS..

as you **READ** through the pages of

and you **SEE**

PRODUCTS ADVERTISED

on which **YOU** WOULD LIKE MORE **INFORMATION**

Use one of these cards

DROP IT IN OUTGOING MAIL
*NO POSTAGE REQUIRED

Mark here FOR MORE INFORMATION ON ADVERTISED PRODUCTS

Your inquiry will be forwarded to the supplier within 48 hours (or less) from the time we receive it.

To The Oil and Gas Journal:
I would like to receive details on products advertised in your issue of Jan. 25, 1954

Page____ By____	Page____ By____
Page____ By____	Page____ By____
Page____ By____	Page____ By____
Page____ By____	Page____ By____
Page____ By____	Page____ By____
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PLEASE PRINT
COMPANY NAME .....
STREET ADDRESS .....
CITY ..... **ZONE NO.** ..... **STATE** .....
NAME ..... **TITLE** .....
This card void after 90 days.

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TULSA, OKLAHOMA

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To The Oil and Gas Journal:
I would like to receive details on products advertised in your issue of Jan. 25, 1954

Page____ By____	Page____ By____
Page____ By____	Page____ By____
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PLEASE PRINT
COMPANY NAME.....
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1

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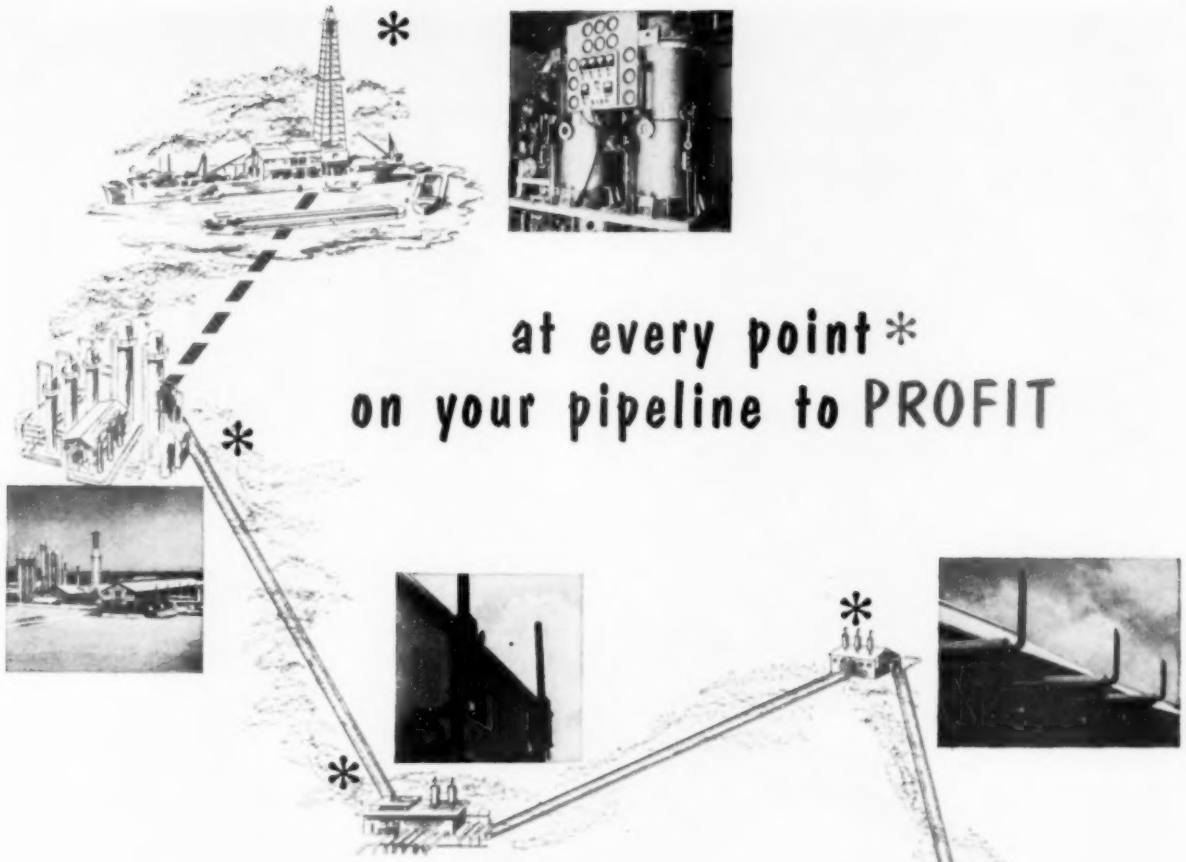
Your inquiry will be forwarded to the supplier within 48 hours (or less) from the time we receive it.



at every point* on your pipeline to PROFIT

. . . Maxim Silencers or Evaporators prove themselves indispensable to the efficiency and economy of the operation.

At the offshore rig, a Maxim Evaporator can supply the large quantities of fresh water needed for operation, eliminating hauling and storage.

At the refinery, for cat crackers, steam discharges, or where spark arrestors are required, Maxim provides excellent protection.

At each successive pumping station, Maxim Silencers effectively blanket the exhaust and intake noise of internal combustion engines, eliminate pulsations in compressor intake and discharge, etc.

Review the efficiency of your operation or process. Very likely, at several points you will find that Maxim can improve efficiency and increase your pipeline profits.

MAXIM

SILENCERS

THE MAXIM SILENCER COMPANY
98 HOMESTEAD AVENUE, HARTFORD 1, CONNECTICUT

BMX54

This Simple Compressor Meets the Complex Needs of a Changing Petroleum Industry

It's the Nash!

Here is a compressor presenting advantages found in no other device. Nash Compressors have only one moving part, rotating without metallic contact with the pump casing. No internal lubrication is required. Yet they produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure.

There are no valves, gears, pistons, sliding vanes, or other complicated wearing parts in a Nash. Compression is secured by an entirely different principle of operation. Because of this, gas pumping problems difficult with ordinary pumps are often easily handled by the Nash. For example, Nash Pumps are standard equipment in the Synthetic Rubber Industry, where they have met the needs of new and difficult processes.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. They maintain original performance over long periods. Service is assured by a nationwide net-work of Engineering Service offices. Instructive bulletin shows how they operate. Write for it.

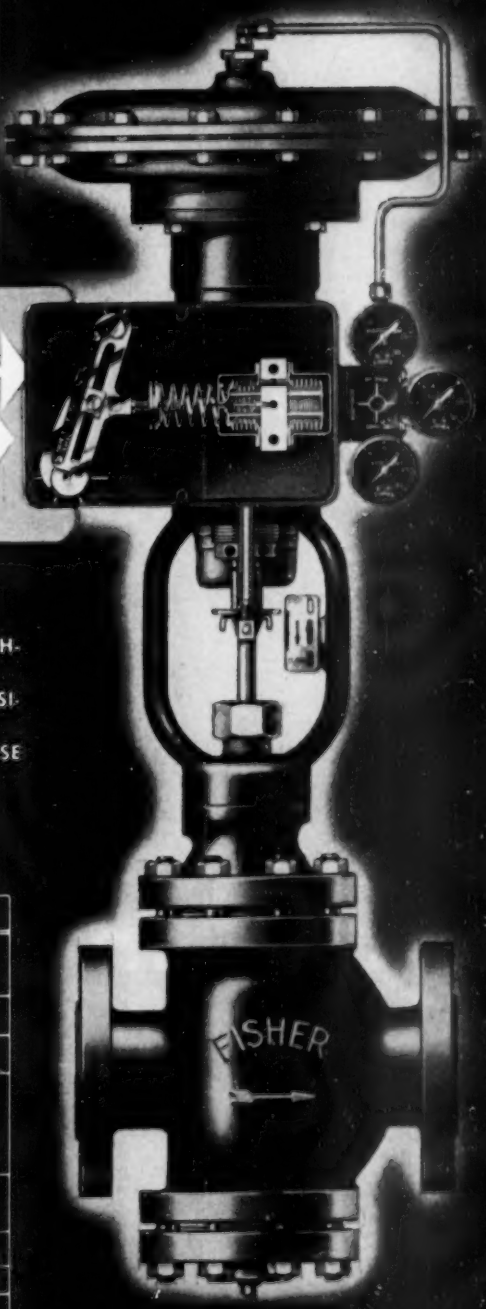
- One moving part.
- No internal wearing parts.
- No valves, pistons, or sliding vanes.
- No internal lubrication.
- Low maintenance.
- Slugs of liquid entering pump do no harm.
- Non-pulsating pressure.
- Saves floor space.
- 75 pounds in a single stage.

NASH ENGINEERING COMPANY
274 WILSON, SO. NORWALK, CONN.

FISHER®

POSITROL®

FOR ACCURATE POSITIVE VALVE POSITIONING



FEATURES

- COMPACT – SIMPLE RUGGED
- 5 YEARS FIELD SERVICE
- EASILY ADJUSTABLE
- FORCE BALANCE TYPE OF POSITIONER
- AVAILABLE WITH OR WITHOUT BY-PASS
- USABLE AS REMOTE POSITION INDICATOR
- FOR DIRECT OR REVERSE ACTION VALVES

TECHNICAL DATA

TEST			FISHER TYPE 3500
INSTRUMENT PRESSURE SENSITIVITY CONTROLLING PRESSURE CHANGE NEEDED TO PRODUCE 2 LBS. TO 15 LBS. TO DIAPHRAGM			0.07 LB
STEM MOVEMENT SENSITIVITY AMOUNT STEM CHANGE TO PRODUCE 2 LBS. TO 15 LBS. TO DIAPHRAGM	½" TRAVEL		0.0037" AVE.
	2" TRAVEL		0.015" AVE.
SPEED TIME IN SECONDS FOR FULL TRAVEL	SIZE	TRAVEL	
	DD	½"	1.2 – 1.2 SEC.
	FF	1"	4.2 TO 4.8 SEC.
	GG	2"	7.2 SPC TO 9.6 SEC.
	HH	2"	10.5 TO 12.6 SEC.
LAG ERROR IN POSITION AT 9 LBS. CONTROLLER PRESSURE	½" TRAVEL		0.0006" AVE.
	2" TRAVEL		0.001" AVE.
EFFECT OF VARIATIONS IN AIR SUPPLY PRESSURE	½" TRAVEL		0.1 LB PER 5 LB. CHANGE
	2" TRAVEL		0.1 LB PER 5 LB. CHANGE
CHARACTERISTICS CONTROLLED P VS DIAPHRAGM P			LINEAR
COMMENTS			STABLE ADJUSTMENTS ALL EASY AND SIMPLE
AIR CONSUMPTION NORMAL 9 LBS. DIAPHRAGM PRESSURE			15.0 CU FT/HR

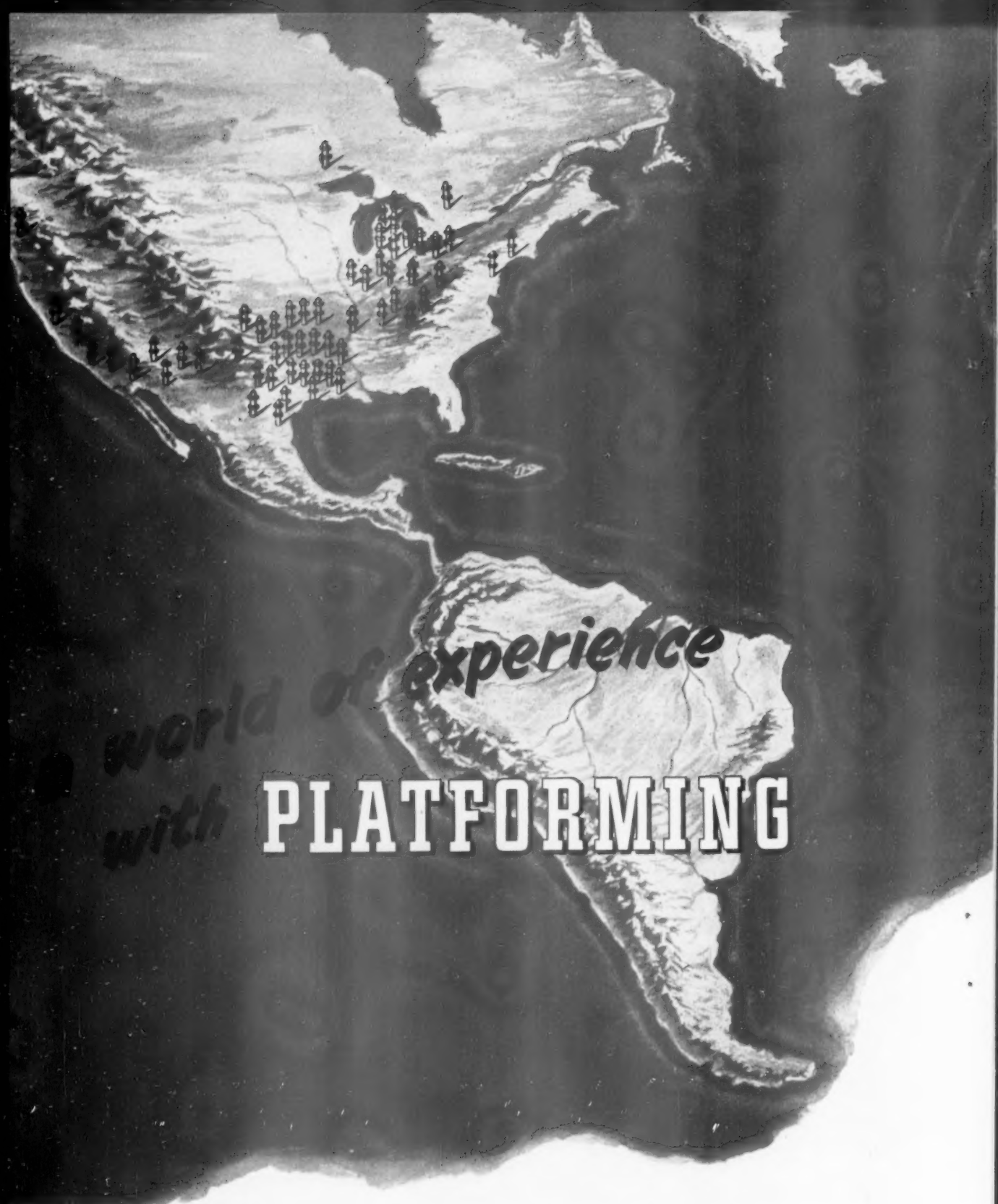
FOR COMPLETE DETAILS WRITE FOR BULLETIN E-3500.

FISHER GOVERNOR COMPANY

Marshalltown, Iowa

LEADS THE INDUSTRY IN RESEARCH FOR BETTER PRESSURE CONTROL

Since 1880


world of experience
with PLATFORMING

73 UNITS—36 on stream . . . 37 in design or under construction—a total of 55 in the U.S.A. . . . four in Japan . . . three each in Great Britain and the Middle East . . . two each in Canada and Australia . . . one each in France, Belgium, Germany and Canary Islands. That's how far PLATFORMING has come since October 27, 1949 when the first unit went on stream at Muskegon, Mich.

Refiners all over the world have chosen PLATFORMING because it is the proved solution to their reforming problems . . . because it produces high octane fuel from low grade charge stocks . . . because it has the aromatics option . . . because it is versatile, economical, and dependable! You can rely on this world-wide experience in making *your* choice.

UNIVERSAL OIL PRODUCTS COMPANY

30 ALGONQUIN ROAD, DES PLAINES, ILL., U.S.A.

Laboratories: RIVERSIDE, ILLINOIS

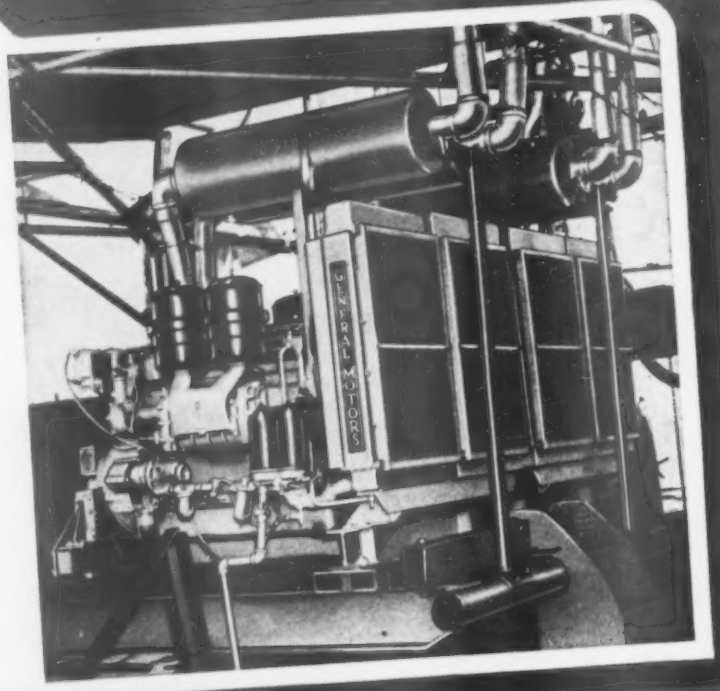
Universal Service Protects Your ***Investment***

GM Diesel
Case History No. ID2B-73

OWNER: Oxford Drilling Co., Albany, Texas

INSTALLATION: Two GM 6-71 Twin Diesels, powering a mud pump and Wilson Giant draw works. Twins replaced two large gas engines.

PERFORMANCE: One of the partners and Drilling Supt. R. W. Oxford reports, "The GM Diesels on this rig operated 20,000 hours without requiring an overhaul. They are faster accelerating, make quicker round trips, and are much more economical on repairs and fuel."



It pays to STANDARDIZE on

GM
GENERAL MOTORS
DIESEL POWER

Drilled 20,000 Hours Without Overhaul

Here's another contractor who has cut drilling costs by switching to dependable General Motors Diesel oil field engines. He increased his footage because fast-stepping 2-cycle operation cut trip time. His maintenance costs dropped because the rugged design of a GM Diesel makes this engine run dependably long after others have become troublesome and inefficient.

What's more, compact size of GM Diesel units makes them easier and cheaper to move—simple design makes preventive maintenance an easy routine—low cost of parts keeps overhaul expense at a minimum. These are among the reasons why this engine is America's *favorite* oil field Diesel. Contact your nearest distributor or write us for a copy of the new catalog describing the complete line of GM Diesel oil field engines.

DETROIT DIESEL ENGINE DIVISION
GENERAL MOTORS, • DETROIT 28, MICHIGAN

Single Engines . . . 16 to 275 H.P. Multiple Units . . . Up to 840 H.P.

GENERAL MOTORS CORP., DIESEL ENGINE SALES, PETROLEUM INDUSTRY, 1504 PHILTOWER BLDG., TULSA, OKLAHOMA

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ALABAMA MACHINERY & SUPPLY CO.

CALIFORNIA—Bakersfield
LAWLESS BROTHERS

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WEST COAST ENGINE & EQUIPMENT CO.

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COLORADO—Denver 9
THE COLORADO BUILDERS' SUPPLY CO.

ILLINOIS—Centralia
WESTERN MACHINERY & ENGINE CO.

ILLINOIS—Mt. Carmel
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UNITED TOOL COMPANY

MICHIGAN—Detroit 4
THE EARLE EQUIPMENT CO.

MISSOURI—St. Louis 10
WESTERN MACHINERY & ENGINE CO.

MONTANA—Billings
SEITZ MACHINERY CO., INC.

Missoula
MOUNTAIN TRACTOR CO.

NEW MEXICO—Albuquerque
THE HARRY CORNELIUS COMPANY

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SWEENEY BROTHERS TRACTOR CO.

Williston
SWEENEY BROTHERS

OKLAHOMA—Oklahoma City
DIESEL POWER CO.

TEXAS—Brownsville—Corpus Christi—Dallas—Houston—Lubbock—McAllen (San Juan)—Odessa—Wichita Falls
STEWART & STEVENSON SERVICES, INC.

Plainview
DIESEL POWER, INC.

UTAH—Salt Lake City 4
CATE EQUIPMENT COMPANY

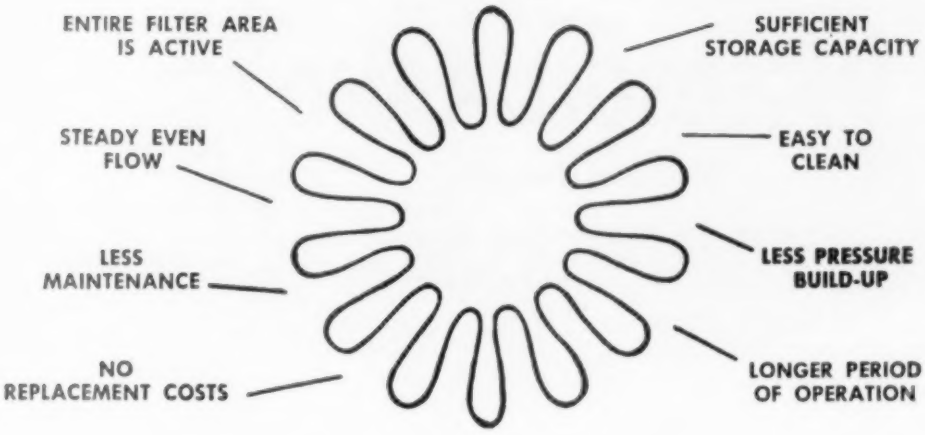
WYOMING—Casper
THE COLORADO BUILDERS' SUPPLY CO.

SUMP TYPE
(Cutaway)

When You Need A Filter Get The Advantages Of Marvels SYNCLINAL Design

It's BALANCED For Top Performance!

LOOKOUT FOR THESE IMPORTANT FEATURES



LINE TYPE
(Cutaway)

For All Hydraulic and Other Low Pressure Liquid Systems

The selection of a filter should not be determined on the basis of total filtering area alone—equal consideration must be given to the provision of ample storage space for filtered out particles. ONE IS JUST AS IMPORTANT AS THE OTHER. Over 400 Original Equipment Manufacturers install Marvel Synclinal Filters as Standard Equipment because they are designed to give this all-important balance for greatest efficiency in filtration of liquids in all hydraulic and other low pressure circulating systems. Flow of liquids is maintained at a constant, steady rate of speed produced by the pump which brings about the desired effect of a gentle, evenly distributed accumulation of filtered out particles against the entire filtering surface with less restriction of flow. Result—longer periods of productive operation at minimum maintenance down-time. If this important balance is lacking due to efforts to cram too much filtering mesh for the sake of total, rather than active area, filters soon become clogged causing pressure build-up, turbulent flow and in general decreases the efficiency of operating equipment. Depend On Marvel Synclinal Filters For All Your Filtration Requirements.

A SIZE FOR EVERY NEED

Marvel Synclinal Filters are available in sump and line types, in capacities from 5 to 100 g.p.m. Choice of monel mesh sizes from coarse 30 to very fine 200.

IMMEDIATE DELIVERY

Marvel not only delivers a top grade filter in both quality and performance, but delivers IMMEDIATELY —shipments are made the same day as orders are received, if desired.

WATER FILTERS In response to the great demand, we have adapted both our sump and line models for use in all water filtering applications. No changes have been made in the basic synclinal design.

MARVEL *Engineering Company*

625 WEST JACKSON BLVD., CHICAGO 6, ILLINOIS

MARVEL ENGINEERING COMPANY OG-1
625 W. Jackson Blvd., Chicago 6, Ill.

Without obligation, please send me complete data on Marvel Synclinal Filters as follows:

Catalog #106 for Oil Filters
Catalog #300 for Water Filters

Name .....
Company .....
Address .....
City ..... Zone ..... State .....

In Your Field Compressor Installation The MOST IMPORTANT Specification Is . . .

WILSON SUPPLY
—
INGERSOLL-RAND
Packaged Portable
COMPRESSORS

"More Performance for Your Dollar"

Contact your nearest Wilson Supply Store or write "Compressor Division," Wilson Supply Company, P. O. Drawer 19, Houston, Texas, for detailed information, and quotations. Please give suction and discharge pressure and volume to be handled.

WILSON SUPPLY COMPANY

Branch Stores

TEXAS: Alice, Corpus Christi, Victoria, Bay City, Columbus, Barkers Hill, Liberty, Beaumont, Kilgore, Monahans.

LOUISIANA: Lake Charles, New Iberia, Houma, Harvey, Shreveport.

1301 Conti St. (Corner of Walnut)
HOUSTON,
TEXAS

Sales Offices

DALLAS
TULSA
SHREVEPORT
NEW ORLEANS
LAKE CHARLES
CORPUS CHRISTI

. . . . . "KEEP RUNNING"

When your field Compressor installation is "down" every hour is a *lost hour* —every day of shut-down time is gone forever.

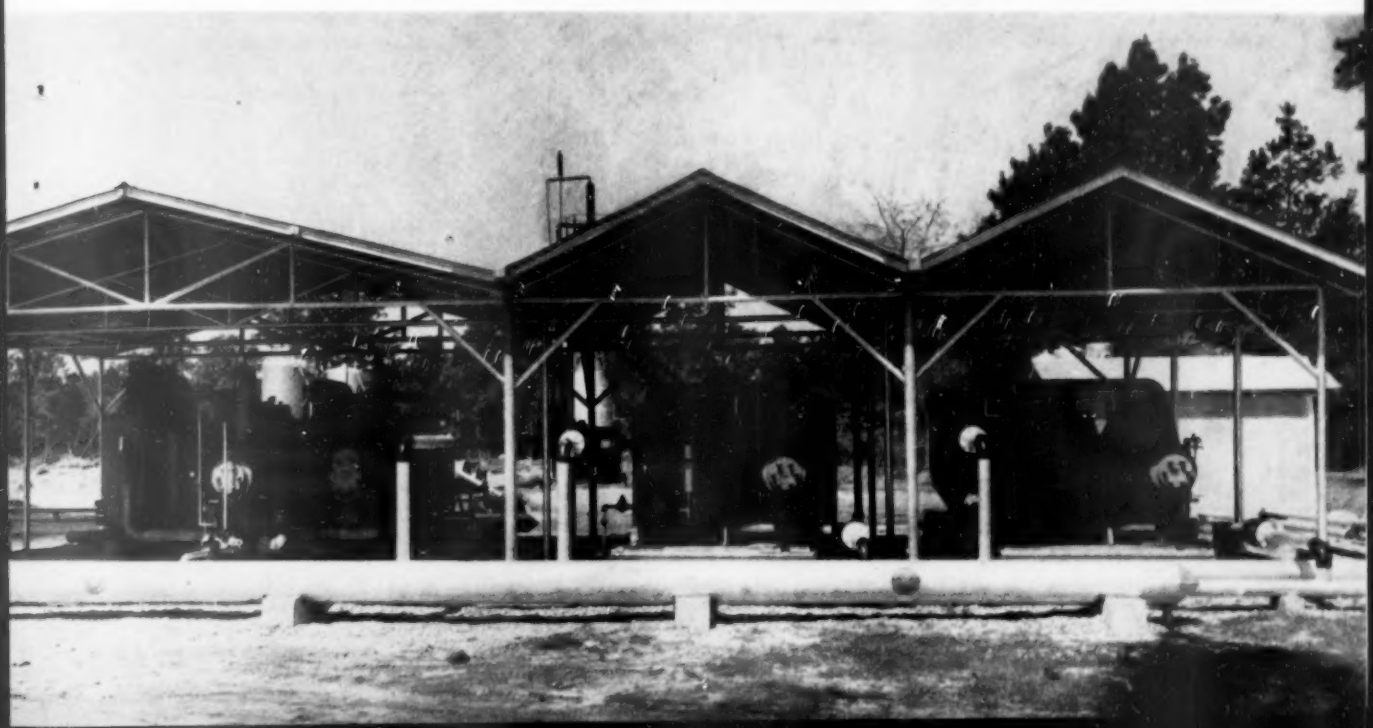
Operators, everywhere, have found that after months and months of operation, Wilson Supply-Ingersoll-Rand Packaged Portable Compressors effect a real economy through continuous day after day performance—less shut-down time— less maintenance costs.

Of equal importance—in event of serious trouble—Wilson Supply Company service engineers are quickly available. If you have a Wilson Supply Company installation—*You Know* who to go to for service.

Wilson Supply-Ingersoll-Rand Compressors are built and fabricated to do a job—continuously, and represent the most compressor performance your dollar will buy.

●

The Wilson Supply Company Compressor Installation shown below is in North Louisiana—one Twin and Two Boosters—handling sales gas.



What's in the Minds of Oil Finders?

. . . Here's how one of them, a former Journal associate editor, analyses the thinking of the men who will find new oil in '54

by Charles J. Deegan

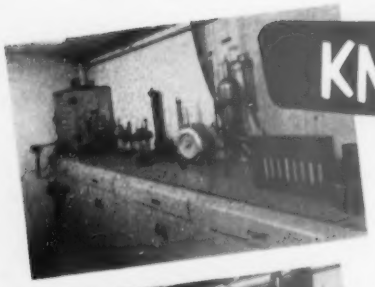
OIL exploration must always be planned in terms of future demand for oil. Exploration precedes oil discovery; discovery precedes oil-field development; and at least partial development must precede the day when the refiners start clamoring for more oil to meet their customers' sudden demands. Therefore the men responsible for oil exploration must be the first branch of the industry to start preparing for this impending explosive demand for more energy per capita.

With that vast future responsibility so clearly impending, a brief review of the past history of exploration may be helpful in seeing why the current situation fits the phrase "the pause that refreshes." During the thirties, with low-priced oil and ample reserves, exploration for oil continued, but on a cautious, penny-pinching basis. There was a substantial expansion in the still relatively new field of geophysics. But even this was influenced substantially by the attitude of caution. A wildcat-drilling recommendation backed by both good geology and good geophysics was not only a better bet, but also a more acceptable alibi if a dry hole resulted.

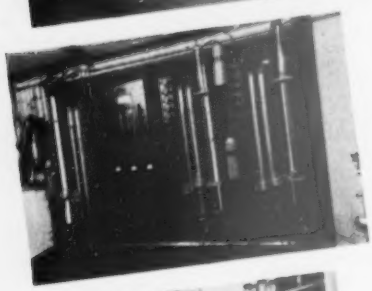
Then came the war with vastly increased oil demands eating up the surplus reserves, demanding replenishment, and at the same time draining off skilled manpower. Those were hectic days when conventional methods and conventional thinking had to do the exploration job with a short-handed, overworked staff.

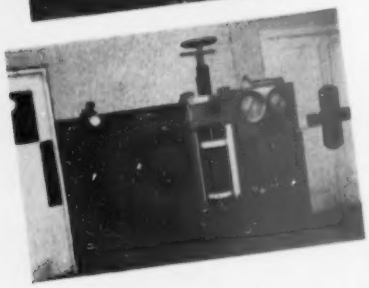
No breathing spell . . . The anticipated postwar breathing spell never material-

The author is petroleum consultant, Dallas.



KNOW by Test





"A hair perhaps divides the false and true"—Omar

And you can depend on Tulsa Testing Laboratory for accurate results. Our staff has had an active background of experience for 26 years—and uses only the finest, most accurate scientific apparatus.

We invite your inquiry, whether your problem is a one-time project or or long-range continuing tests.

ENGINEERS
METALLURGISTS
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GEOLOGISTS
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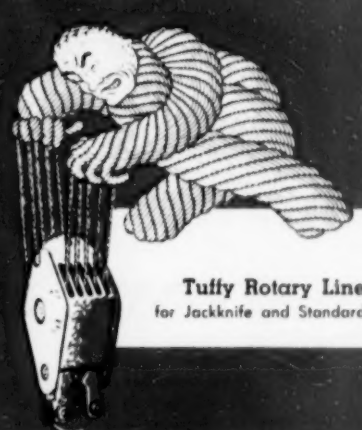

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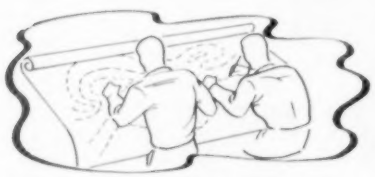
ized. The pent-up demands of a civilian population and returned veterans kept the petroleum industry scrambling, even as other industries, just to keep pace with current problems. Just as that situation was about to ease, the Korean war broke out and the mad rush of the United States to rearm brought another wave of large demands on the petroleum industry.

Despite these two postwar periods of expansion, the exploration branch kept gaining some ground. Depleted manpower staffs were replenished; research staffs were gradually built up; and even in the midst of the rush of greatly expanded routine work, the pressure was gradually eased. Little by little more and more exploration men began to have some time to think about fundamentals.

Now after nearly 8½ years of sometimes frantic scrambling to keep pace with postwar day-to-day problems, the first half of 1954 looks like a period



when the daily routine will slacken a bit. During all this time a lot of ideas have been generating; the research laboratories have been getting their teeth into more and more fundamental problems. The research staffs and the men working on the problems on the firing line have been learning to work together more closely and to understand each other's problems.

Scientific history has proved time and again that what is known as "cross-fertilization of ideas" can result in great forward strides in any field of knowledge. A little time is now available to exploration men for more detailed exchange of ideas, for various groups to confer on problems, and for many men to discover what ideas various individuals have developed about specific problems, perhaps in other areas.

There will undoubtedly be more intracompany conferences at every level in the exploration departments. At least some companies, possibly with more foresight than others, will expand their budgets for attendance at conventions, and send more of their younger men to various regional meetings. Some companies, looking ahead to possible reassignments in the near future, will even send many of their younger men to regional meetings outside the geological province in which they are now working.

Accelerated tempo . . . Many new ideas and concepts will come out of these conferences and this period of expanded crossfertilization of ideas. Some of these will be so promising and so exciting that the first steps will be taken by the last half of 1954. That is why it is safe to predict that the last half will see a stepping up of exploration tempo in unexpected directions.

Obviously the specific cases and areas where new ideas and concepts will develop will be company secrets. But some of the general trends are plain, and most companies will follow up on these, regardless of what else they do. Here are some of them.

More attention and weight will be given to geological environment than at any time since the early days when wildcats were mostly drilled near surface seepages. There will be less emphasis on "structure" and more on the term "trap." The specifications for a "satisfactory trap" will be relaxed considerably. The range and type of formations to be considered as potential reservoir beds will also be expanded substantially. The tendency to classify wildcat prospects as Grade A, B, C, or D will continue, but the weight attached to the various components that result in that rating will gradually shift.

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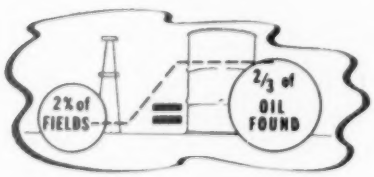
marily on excellent structural characteristics, may be downgraded if the environmental factors do not seem strong. A prospect formerly graded C because of lack of evidence of strong structural characteristics, might be upgraded to A if the geological environment factors looked promising; if in terms of trap rather than structure it looked better; and if it also promised a wider range of possible reservoirs under the newer concepts.

Timely reminder . . . More exploration executives will discover what some have already found out. That is that somehow a lot of younger geologists and geophysicsts have unconsciously gotten into the habit of thinking that only very deep tests can find a big oil field. They will then remind these youngsters that quite a few major fields of 100 million barrels or more have been found at very shallow depths; Yates, Avant, and Glen Pool at less than 2,000 ft.; Burbank, Eldorado, Kansas, and Smackover at less than 3,000 ft.; and of course East Texas, the largest in the United States, at less than 4,000 ft. This unconscious error isn't important while the youngsters are working in an old producing province, under supervision. But it might lead to some costly oversights when they are given more responsibility and transferred to a newly developing province, such as the Williston basin.

The present trend toward more emphasis on geological environment and less on structure may be puzzling to many independent operators who have absorbed quite a bit of practical geology over the years. So they can understand why this is a permanent trend, and not a current fad.

Although the long-term trend in geological research was definitely headed in the general direction of environment, a discovery in the postwar period gave it a big boost. This author, while with The Oil and Gas Journal, discovered and publicized the fact that about 2 per cent of all the oil fields



ever found in the United States contained about two-thirds of all the barrels of oil ever found. Obviously these were the big-profit fields, and the research departments of several of the major companies began to investigate this angle.

At least one of them soon found that the same condition held true in other commercial minerals, such as gold, silver, platinum, uranium, copper, nickel, lead, zinc, aluminum, iron, etc. Small deposits of these minerals were not too uncommon in the earth's crust, but a very small percentage of the total number of deposits accounted for the bulk of the commercially profitable ore. When the rich iron deposits of the Mesabi range in Minnesota began to run low, the big steel companies went to Labrador, Venezuela, Africa, Cuba, or Brazil to mine the rich deposits found there, rather than the numerous small deposits available in the United States.

Broad discovery . . . This line of research soon leads to an even broader discovery. Starting with such obvious things as the fact that most of the lions, elephants, giraffes, kangaroos, and such odd animals were found in only a few areas of the world; or that the same thing held true of the giant Sequoyah trees, they wound up with this startling conclusion.

Except where man had modified the natural environment, the rich concentrations of all natural flora and fauna were found in only a relatively few areas of the world. In fact, considering the total surface area of the earth, naturally rich, fertile farm land was scarce

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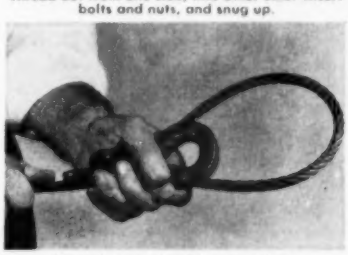
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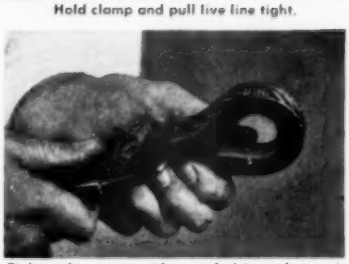
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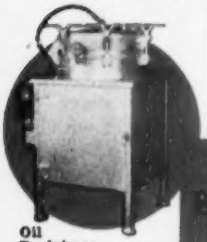

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and most of it is concentrated in a comparatively few spots around the globe.

Now the research men had minerals, flora, and fauna all conforming to a common pattern. Any intelligent re-

search man could immediately see that he was dealing with some universal law of nature, of which the distribution of oil fields was only one special phase. Furthermore as soon as he started looking into the distribution of plant and animal life on the surface of the earth, where observation was easy, the cause soon became apparent.

A difference of a few degrees in temperature, a difference of a few inches in average annual rainfall, a slight difference in the acidity or the alkalinity of the soil, a slight difference in the trace mineral composition of the soil—any one or a combination of these explained why certain plants or animals flourished in abundance, or thinned out to complete absence. The key to gradations of abundance was obviously environment, and furthermore a very special kind of environment, often a rare combination of factors.

Scarce article . . . A few quick calculations confirmed what every wildcatter already knows. Considering the total cubic miles of rock tested by both wildcats and development wells, an oil or gas deposit of any kind is a scarce article in the earth's crust. The fact that of even these scarce deposits, a mere handful, perhaps 2 per cent or less, contained most of the oil, was only what should be expected from the universal natural law that controls the distribution of all minerals, fauna, and flora.

From the universal law it is apparent that some factor or rare combination of factors in the environment is necessary to produce any oil, and a still rarer combination of those factors is essential to produce a lot of oil.

Where do we stand today with this new knowledge; how can we use it to make exploration more profitable? To a large extent, no one knows for sure. Much of the detailed work and such conclusions as have been reached from this work are naturally deep, dark company secrets. And they are secret for an excellent business reason.

In order to gain a tremendous competitive advantage in oil finding, no company needs to develop a perfect formula or tool, or anywhere near a perfect formula or tool to determine the exact factors of environment that control things. At present only about 1 wildcat in 1,000 finds a major oil field; 1 wildcat in about 45 is said to find a field that nets a profit after development; 1 wildcat in 5 to 10 finds some kind of oil or gas.

Odds must improve . . . Adding even partially correct specifications about environment to the existing exploration methods can hardly do anything else but improve these odds, however, imperfect the environment specifications may be. Since all current methods continue to be used, the odds can hardly

get worse. If the environment ideas are even partially correct, the chances of finding some kind of an oil field are improved; the chances of finding a profitable field are substantially improved; and the chances of finding a major field are greatly improved. That

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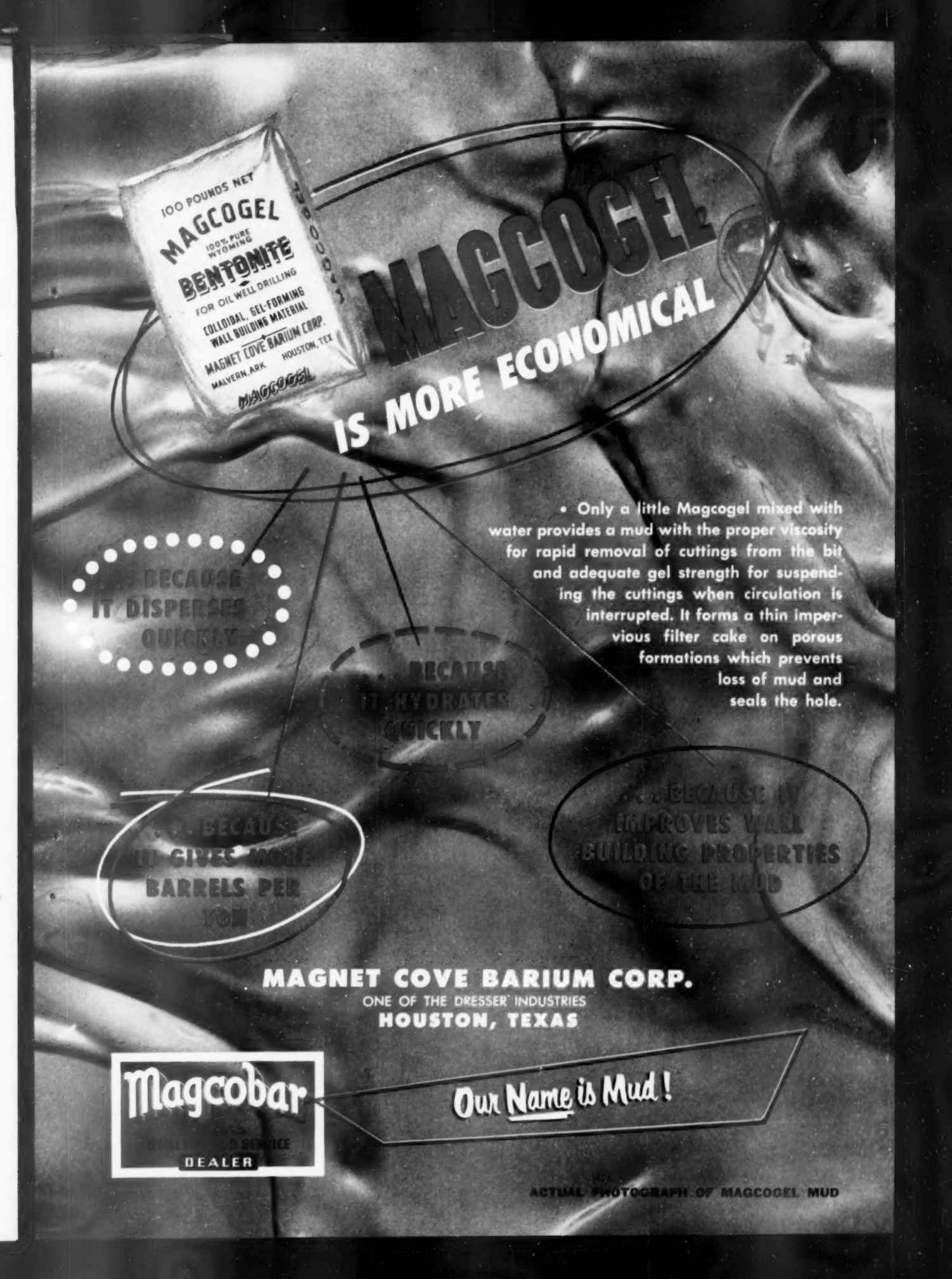
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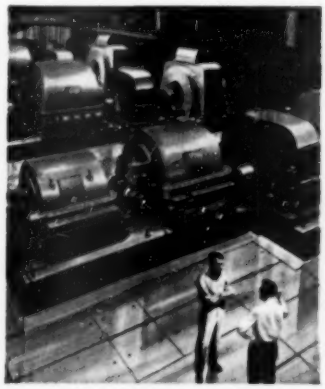

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conclusion seems logical just from the arithmetic of the present odds; 1 out of 5 to 10; 1 out of 45; 1 out of 1,000.

So much for the reasoning back of the shift of emphasis toward geological environment. What about the changes in thinking and shift from structure to trap, and widening the scope of formations to be thought of as "potential reservoirs."

These two ideas are the result of gradual development and observation of the facts of life about oil fields that have been found, as opposed to classical theories. Large amounts of oil have been found in recent years in traps that required a violent stretch of the imagination to label structure. Furthermore oil was being found in fractured rock formations and also in metamorphosed schist below what had previously been considered basement. The interest in fractured reservoirs resulted in studies which revealed that many more of our older fields were of a similar type than had been dreamed.

Worse still, from the standpoint of classical theory, oil fields found on true structures often failed to conform in shape to the structural outline. It was obvious that many of them were confined to porosity traps located on portions of the structure where extra high porosity had developed. Some geologists began to ask "what is the difference between an oil field found in a porosity trap that happens to be located on a definite structure, and an oil field found in a porosity trap where there is little or no structure?"

Finally an excellent postwar classification of oil field structures, by its very complexity and numerous subdivisions, revealed that obviously the classical type of geological structure might not be any more commonly associated with an oil accumulation than other types of trap.

Ideas mesh . . . The combination of these ideas about traps and reservoir rocks meshed into the discovery that oil accumulations follow a universal law of nature in which environment plays a major factor. So some geologists began to think along such lines as this.

When the environment is right for the formation of oil, it is formed and then migrates into the nearest and handiest trap. It is apt to migrate into any kind of rock that has porosity to hold it. Therefore if the formation is a thick, highly porous sand, with a good tilt, a lot of oil will accumulate underneath a relatively small number of surface acres.

But if the handiest porous formation is a comparatively flat, very tight sand, with only a small amount of pore space per cubic foot, we will find a Spraberry. Or—if the nearest porous rock is a limestone, which has less pore space per cubic foot than sandstone, then any given amount of oil will have to spread out to find reservoir room, and the oil is apt to underlie a larger number of surface acres.

Geologists have always known that there is no definite and dependable relationship between the amount of oil found, when found, and the areal size and structural relief of the trap. If this had been true, the oil-producing structures of the Rocky Mountain area would have swamped the United States market with oil long ago.

So, today, at least some of them are thinking like this. The total amount of oil we find in any given field depends mostly on whether the unknown, but critical combination of environment factors were favorable for the origin of a lot of oil near that trap. If the environment was right, we may find a big trap completely filled; if the environment wasn't quite right, we may find either a big or a small trap with no oil or gas in it. If a lot of oil was formed and the handiest trap was relatively small, it will probably be filled to the spill point.

In summary, this kind of thinking leads to this conclusion. The kind of reservoir rock, or the size of the trap is not nearly as important as the question of whether or not they are located

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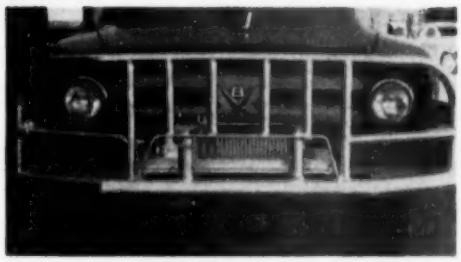

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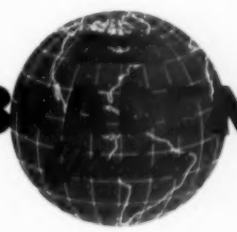


near a spot where environment is favorable for the origin of a lot of oil.

Ideas not new . . . These ideas are of course not completely new in oil exploration. A completely new idea or combination of ideas is rather rare in any field. Drilling near surface seepages is old; playing along producing trends is as old as the industry. A structure of Grade C in a prolific producing trend has never been a difficult prospect to get drilled. Playing producing trends has always been profitable exploration practice—for a while. Then that trend plays out and wildcatting success ratios drop until someone opens up a new trend. Now we are beginning to have some new ideas about why that particular trend played out.

In the past many of these producing trends could be associated with regional structural features by geologists. They will continue to do this, but many of them will do so from a new point of view. Now they will look at the regional structure along a proved producing trend and judge it as an indication of a certain type of environment favorable for the formation of oil. A similar environment elsewhere, not associated with such a prominent regional structure, might also produce a trend of oil accumulations.

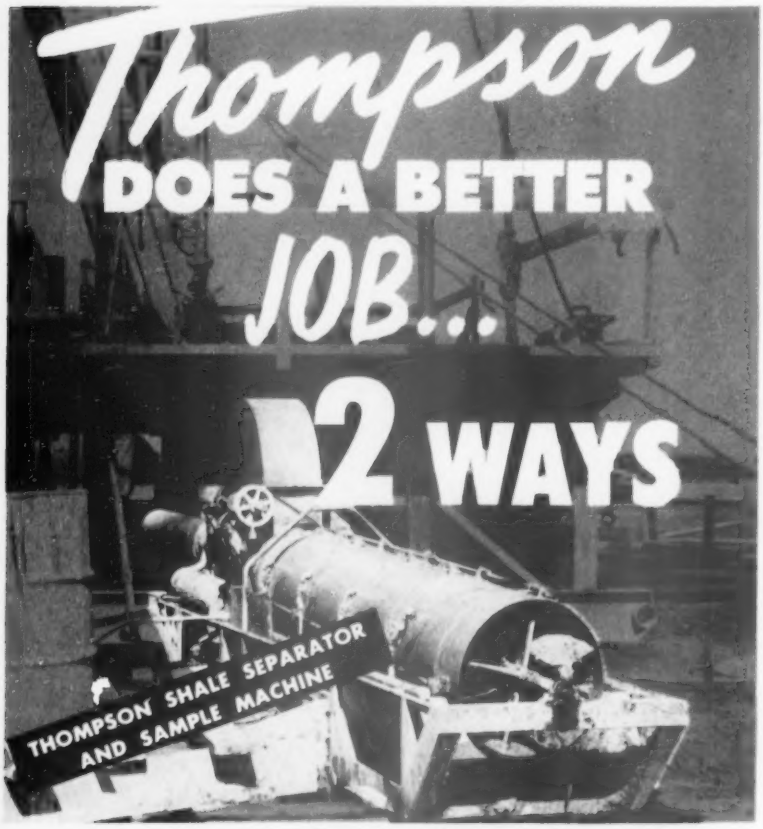
The biggest surface change that will be apparent in exploration thinking will be the increased amount of interest displayed in data on the area adjacent to the trap containing the oil. The oil migrated from someplace into its present location, probably from not too far away. What kind of clues are available about the environment of that area where the oil probably was formed?

Subsurface geology, cross-sections, isopachs, and data on facies changes will be studied from a new point of view—and who knows what relationships will suddenly become apparent in old data, merely because an imaginative geologist looked at the data from a different point of view? All the accumulated knowledge about litho-facies and bio-facies changes and the clues they give to a changing environment will take on a new and more vital meaning. Geophysical data may be studied as eagerly offstructure as they now are on or near structure. Is it possible to derive information about environment from the character of seismic records? In addition to their value in getting a quick regional picture, do those self-potential field measuring instruments, the gravimeter and magnetometer, give any other significant information, awaiting only the interpreter with a different point of view?

Time is ripe . . . During this early 1954 pause in exploration's feverish tempo, all these and many other ideas will be discussed in many companies and among many groups. The scene and the time are ripe for a vast crossfertilization of ideas and for some entirely new points of view. After this crossfertilization, exploration technologists can individually take a new look at their entire accumulation of knowledge, ideas, and experience.

The material, the men, and the ideas are present now for an explosion in oil-exploration ideas and activities over the next decade that may revolutionize our present hunting techniques. Judging from what we know of other scientific and technological fields, just such an explosion and revolution will be necessary if oil exploration is to maintain pace with the terrific expansion in society's energy demands that lies ahead in the next two decades.

The present pause is merely for regrouping of forces and equipment, rearrangement of ideas, reorganizing for the next big thrust. The potentialities are so vast that it is unsafe to predict just what will at least start happening even as early as the last half of 1954. The only safe thing to predict is that some very unusual things will get started then, even if we don't recognize their significance until much later.



Takes Heaviest Mud Flow
Self-motivated
Easily Transported
Easily Installed
Economical to Operate

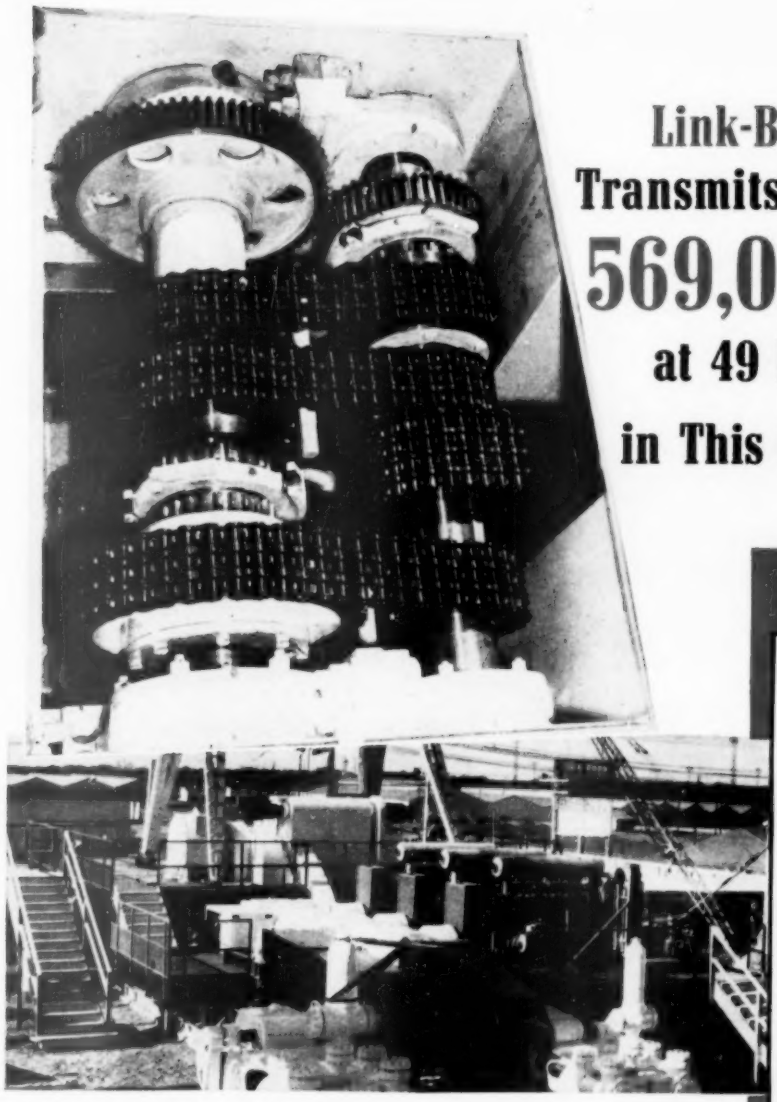
SOLD ONLY THROUGH SUPPLY STORES

For years . . . Thompson Rotating Separators have been on the job doing a BETTER JOB separating destructive shales and abrasives from expensive drilling muds and . . . giving accurate analysis of the progress of the well through the Famous Thompson Sample Machine. No Drilling Contractor should be without a Thompson Shale Separator for Thompson *adds life* to your drilling tools and *SAVES MONEY*. Write Thompson today for complete details . . .

Manufacturers of All New Thompson Vibrating Shale Shaker

Thompson TOOL CO.
IOWA PARK, TEXAS

Link-Belt Roller Chain Transmits Power to Handle a 569,000 Lb. Load at 49 Feet per Minute in This Bethlehem 1013 Rig



Performance Specifications Bethlehem 1013 Rig

Hook Speed 8 Lines Ft. per Min.	Hoisting Capacity with 8 Lines Hook Pull in Pounds 1200 H.P.
DRUM R.P.M.*	
45	49	569,000
73	80	351,000
122	134	210,000
155	170	165,200
249	274	102,800
420	460	61,000

*Drum R.P.M. based on 900 R.P.M. engine speed.

Single line speeds are based on 1¼" Wire Line in third layer on drum.

Hoisting capacities are based on 1¼" Line in third layer on drum, 80% rig efficiency and 1½% loss per line strung up.

THIS heavy duty rig uses three engines compounded by means of Link-Belt Precision Steel Roller Chain. The straight mechanical transmission, which gives 6 drum speeds is also Link-Belt equipped. The rig features a choice of fluid coupling, electric coupling, hydraulic torque converter drive or a mechanical transmission. "All chains are precision-roller and are selected for their particular application with the advantage of wide interchangeability in mind."

Link-Belt Precision Roller Chain is "made to order" for such service because its shot peened rollers and specially processed side bars give it the high fatigue strength needed to endure severe loading.

Balanced design, precision manufacture and controlled heat treatment also contribute to the outstanding service life of Link-Belt Chain. Call your nearest Link-Belt sales representative or write for Book No. 2480.

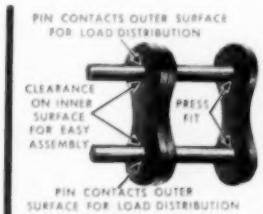
LINK-BELT

PRECISION STEEL ROLLER CHAIN

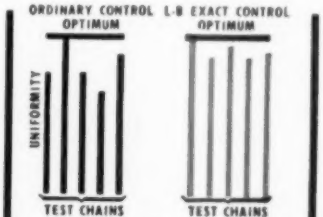
LINK-BELT COMPANY: Indianapolis 6, Houston 1, Dallas 1, Los Angeles 33, Scarboro (Toronto 13); Export Office, New York 7. Distributors in All Fields.

Don't overlook these LINK-BELT extras

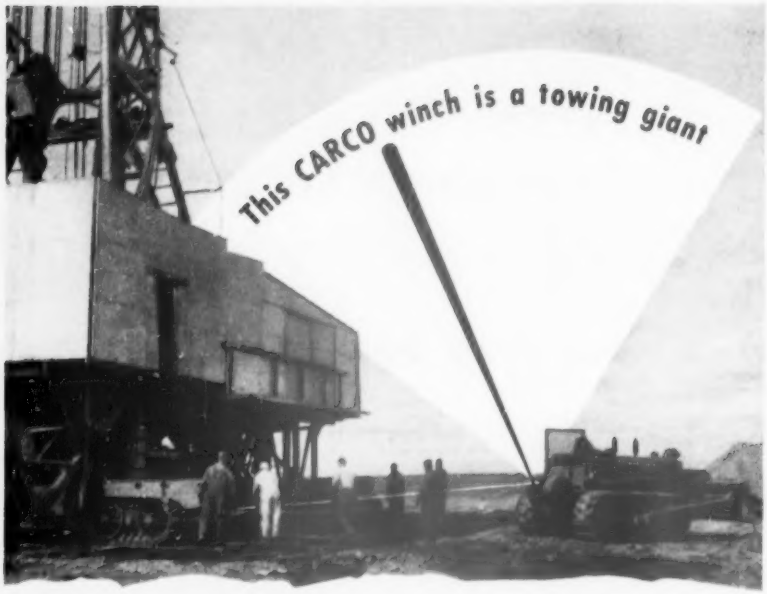
Shot-peened rollers have extra fatigue life under impact.


PIN CONTACTS OUTER SURFACE FOR LOAD DISTRIBUTION
CLEARANCE ON INNER SURFACE FOR EASY ASSEMBLY
PRESS FIT
PIN CONTACTS OUTER SURFACE FOR LOAD DISTRIBUTION

Couple and uncouple multiple-width chains more easily.



Closer heat treat control helps attain greater uniformity.



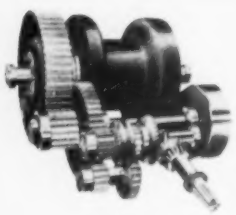
Rigs weighing up to 225 tons moved up to 8 miles

. . . thanks to pulling power of CARCO winch!

Without disassembling, rigs are moved from one location to another in the Tioga oil field in North Dakota. A Model J Carco winch on an International TD 24 is used by the Mendenhall Construction Company to do the pulling. Towing rigs weighing from 150 to 225 tons from two to eight miles is a real test of a winch innards. Hills, mud, sand, snow and frozen ground present problems. If the tractor loses traction, the operator releases winch brake and, paying out line, moves ahead to firm footing. He then winches the rig up to the tractor. The efficient doubling of tractor pulling power does the job.

Mr. Mendenhall states that Carco winches are more compact and better constructed. In over 2000 hours of rough, tough work, maintenance expense has been zero.

You can expect greater value from the leading producer, and get it from Carco, first in winch production. PACIFIC CAR AND FOUNDRY COMPANY, Renton, Washington. Branches at Portland, Ore., and Franklin Park, Ill.



Doubling the pulling power of the most powerful crawler tractors calls for a gear train that's tough and rugged. The Carco Model J winch converts tractor power into line pull efficiently and directly through a 4-stage constant mesh gear train. The doubled line pull is made possible by a high ratio of gear reduction. As faster line speed is generally desired for paying out the line, a lower gear ratio is provided in reverse. Heavy-duty gears and shafts of heat-treated special alloy steel guarantee a large overload capacity. Precision cut, gears and shafts, with anti-friction bearings, operate in a continuous oil bath.

WINCHES
FOR ALL INDUSTRIAL TRACTORS

CARCO®

CANNON PLUGS

give exploration flexibility

...from the air
...on the ground
...under the sea

Modern science has given oil exploration operations a global scope. Probing for oil under mountains, deserts, oceans and jungles demands flexibility of equipment. Such flexibility is inherent in Cannon's vast line of electric connectors... the world's largest and most versatile line.

FOR AERIAL EXPLORATION

For aerial exploration with magnetometers and "flying laboratories" Cannon's K Series provides 3 basic shell designs 1 to 82 contacts and 204 contact layouts. Designed for aircraft uses, particularly on sensitive electronic equipment, Cannon's K Series play a vital role in the success of aerial oil exploration activities.

FOR SURFACE EXPLORATION

For surface exploration over all kinds of terrain and in all kinds of weather, Cannon's XK Series provides the required flexibility for seismometers, amplifiers and dynamic recording equipment. With strong zinc or steel shells, moisture resistant insulation and special Acme thread coupling, the XK Series is well adapted to geophysical exploration.

FOR UNDERWATER EXPLORATION

For handling seismographic circuits under water, Cannon's W Series offers 4 shell designs, from 1 to 52 contacts and 53 layout variations. Featuring heavy brass shells, and special sealing rings, Cannon's Waterproof Connectors perform without fail under the most rugged service conditions.

CANNON ELECTRIC

Since 1915

CANNON ELECTRIC CO., LOS ANGELES 31, CALIF.
Factories in Los Angeles, Toronto, New Haven. Representatives in principal cities. Address inquiries to Cannon Electric Co., Dept. L-164, Los Angeles 31, California.

EQUIPMENT MEN
. . . in the News

Totco Names Harralson to Hobbs Service Position

J. R. HARRALSON

J. R. Harralson has recently been employed as a service representative for Technical Oil Tool Corp. in the Hobbs, N. M., area, according to H. H. (Pete) Peters, president of Totco. Harralson is well known in Hobbs, where he has worked for several years with drilling contractors and oil-tool companies. Harralson will operate under the direct supervision of Phillip Fouche, Hobbs area manager.

International Nickel Sales Appointments Are Announced

J. M. Weldon has been transferred to general sales department of International Nickel Co., Inc., as assistant to the vice president, according to W. C. Kerrigan, general sales manager.

In other appointments, C. J. Bianowicz has been named manager of Inco Nickel Alloys Department, and Daniel W. Machon has been placed in charge of the newly established cobalt section of the sales department.

Weldon, in his new position, will deal principally with the company's mill and foundry products. Associated with International Nickel since 1927, he has held various assignments in the sales, executive, and other departments.

Bianowicz previously was in charge of I.N.A. department's industrial sales. He joined International Nickel in 1928 as a salesman in the department he new heads, and last August completed 25 years' service with the company.

Machon joined International Nickel in 1949 as a representative abroad, serving in this capacity until March 1952, when he returned to New York.

Broderick & Bascom Inaugurates New Service

Broderick & Bascom Wire Rope Co., St. Louis, manufacturer of Yellow Strand wire rope, has devised a new service plan for wire-rope users. Named the Yellow Strand Speedi-Service Plan, the program will be administered by Broderick & Bascom distributors.

The core of the Speedi-Service Plan is a record file of equipment users' wire-rope needs. These needs are determined by a survey taken by distributor salesmen or by facts supplied by the user himself. The facts obtained are transferred from the survey form onto permanent record cards, one for each piece of equipment. At the time of transfer, distributor stocks are checked and any ropes that may be needed in the future are ordered for stock. The

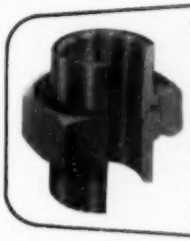
Johnston Testers Concludes Series of Sales Meetings

Last of series of sales meetings for Johnston Testers was held at the Biltmore Hotel, Los Angeles. T. M. Johnston, executive vice president, and J. E. Smith, vice president in charge of sales, conducted the meetings which were held in Houston, Midland, Tex.; Wichita; Casper, Wyo., and Los Angeles. Purpose of the meetings was to provide the Johnston field organization an opportunity to hear first-hand reports on progress being made in developing greater efficiency in drill-stem testing. Attending the Los Angeles meeting were: Dave Crockett; Charles White; John Flanagan; Dick Stanier; Cecil Weaver; Homer Hollingsworth; J. E. Smith, vice president in charge of sales; M. O. Johnston, chairman of the board and president; T. M. Johnston, executive vice president; W. F. Bettis, vice president in charge of West Coast operations; Bud Johnston; Parker Glass; E. T. Scott; Meryle Sutliff; Warren Johnston; Harold Masters, and Richard Henderson.

Catawissa
PERFECT SEAL
Unions

HOT FORGED from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

A TYPE FOR EVERY USE!
FOR ALL PRESSURES!
FOR ALL TEMPERATURES!



Standard & Double Extra Heavy
UNIONS
Available with screwed or socket weld ends. 3000-lb. sizes ⅛" to 4"; 6000-lb. sizes ¼" to 2".

ORIFICE UNIONS
With screwed or socket weld ends. 3000-lb. and 6000-lb. service.

MALE & FEMALE UNIONS
With steel-to-steel, bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.

Standard & Double Extra Heavy
LUG NUT UNIONS
Hammer-type for quick opening and quick closing.

Write for your free copy of catalog 11 for complete information

CATAWISSA VALVE AND FITTINGS COMPANY
450 Mill St. • CATAWISSA, PA.

TWICE AS MUCH FLUID OPENING

with the GUIBERSON FUL-FLO SQUARE KELLY

Guiberson's Ful-Flo Square Kelly gives you *more than twice* the fluid opening of conventional bored forged kellys. This means more volume circulated with less pump pressure. Kelly is designed to work smoothly with Guiberson Drilling Heads as well as in conventional rotaries. Ful-Flo kelly is ideal for drilling, reverse circulation and clean-out jobs.

MORE ADVANTAGES

- Feeds easily through kelly bushing because of smooth, straight sides.
- Won't whip because it's perfectly balanced.
- Less wear—passes easily through the packing rubber.
- Gives maximum flow—smooth liner tube walls with no offsets or restrictions. (Take a look through one!)
- Greater stability and perfect balance reduce wear on related drilling equipment.

Built like a truss, the Ful-Flo Square Kelly is *extremely strong*, but with *less weight*. Square, seamless outside tubing is welded securely to seamless liner tube. Every kelly is tested at 3,000 PSI.

Better Be Safe Than Sorry!

THE

GUIBERSON

CORPORATION

ESTABLISHED 1919 • DALLAS, TEXAS, U. S. A.

Sold By Leading Oil Field Supply Stores Everywhere

equipment records are kept up to date by distributor personnel.

When a rope requires replacement, the user just phones his Broderick & Bascom distributor, telling him what machine needs the rope and what rope it is. The distributor's rope men consult the record file and can tell in an instant the exact length, size, construction, grade, and lay of rope needed. The wire rope order is filled from stocks maintained for the user's needs and is ready for immediate delivery.

Lane-Wells Announces Fellowship Awards

Announcement has been made of two more men, A. B. Crowther, Jr., and Floyd Caylor, now taking advanced

CROWTHER, JR.

FLOYD CAYLOR

studies on fellowships granted under the Lane-Wells scholastic program, designed to aid promising students and graduates to continue studies and research in petroleum engineering.

Crowther, who plans to specialize in exploitation engineering, is studying at University of Texas. A native of San Antonio, he gained his B.S. degree at Texas A. & M.

Caylor is now carrying on advanced studies at University of Oklahoma. After 3 years at the U. S. Naval Academy at Annapolis, he went to University of New Mexico, where he earned his B.S. degree in mathematics.

Stewart & Stevenson Men Win Top Leadership Spots

Fourteen salesmen from Stewart & Stevenson Services, Inc., distributor of General Motors diesel engines, were listed among the top 18 in the final W. T. Crowe Diamond Award standings for leadership in G. M. diesel sales during 1953.

Ray Loden placed first in the standings for Detroit Diesel Engine Division's central southwestern sales zone, which includes Texas and Oklahoma. Loden also placed first in standings released earlier in the year.

Other Stewart & Stevenson salesmen in the top 18 are: N. N. Elkins, Emmett Dobbs, M. McInnis, L. L. Howell,

Air-handling specialists for 100 years

Starting in 1854 with the invention of the Rotary Positive Blower by our founder, Francis M. Roots, our company's services to industry were, for many years, devoted exclusively to air-handling problems.

As industry developed new applications of gases for fuels and chemicals, it was a natural step for us to move into this field because the general principles of moving and measuring air and gas are so closely similar.

Thus, Roots-Connersville service has been widened to include seven basic types of equipment . . . all devoted to the handling of either gas or air. The most recent development has been the new, amazingly efficient Spiraxial Compressor, first marketed in 1953.

So, for a century we have been engaged exclusively as specialists in handling gas and air. That is our only business. We like to think that this is one of the important reasons why R-C equipment has been so widely accepted in every industry where processing involves the movement of air or gas.

The growth which we have experienced over 100 years could not have been possible without the loyal support of our many thousands of customers. We thank them for this evidence of good will—and we offer the same high type of equipment and service to any industry that has a problem of moving gas or air.

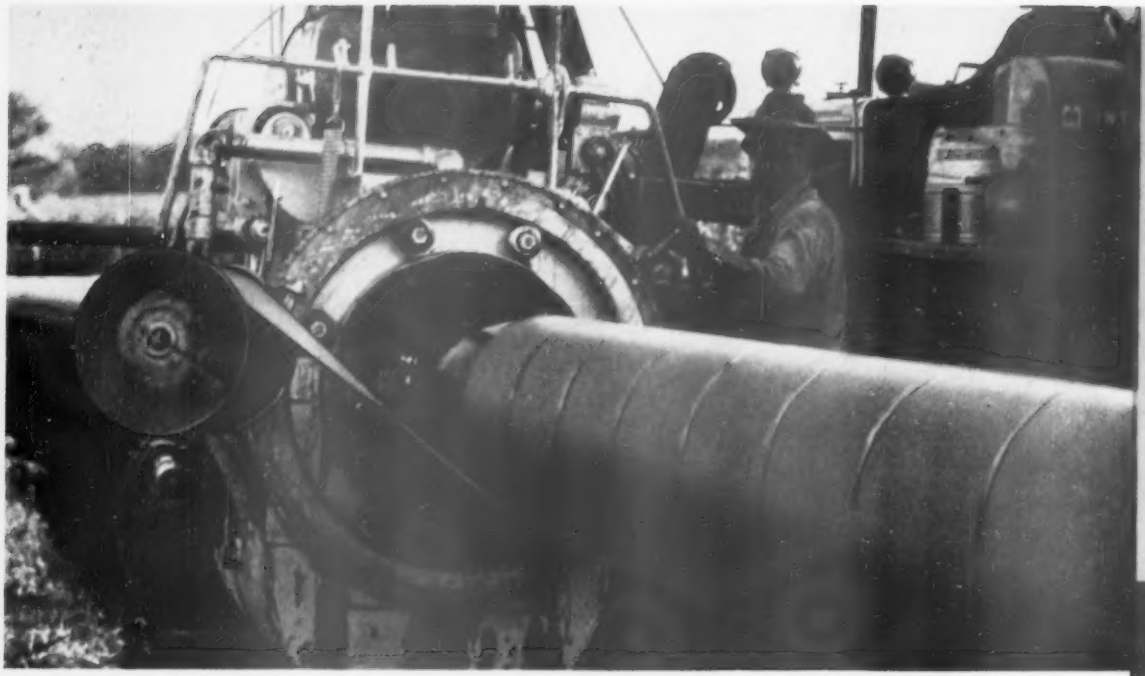
Reg. U.S. Pat. Off.

ROOTS-CONNERSVILLE BLOWER

BLOWER BUILDERS SINCE 1854

A DIVISION OF DRESSER INDUSTRIES, INC.
154 Oak Ave. • Connersville, Indiana

Centrifugal and Rotary Positive Blowers and Exhausters • Positive Displacement Meters • Vacuum Pumps • Gas Pumps • Inert Gas Generators • Spiraxial Compressors



THE REASONS BEHIND THE PREFERENCE FOR NO-OX-ID

In addition to their superior protective qualities, there are many reasons why NO-OX-ID pipe coatings and NO-OX-IDized wrappers are preferred.

LIGHTER WEIGHT... NO-OX-ID weighs less and covers more pipe footage—thus providing substantial savings in handling costs.

CHOICE OF APPLICATION METHODS... NO-OX-ID can be applied by hand over rough terrain or on short line jobs—by Traveliner on long lines—at the mill or yard by many independent applicators and utilities.

SAVES ON LABOR AND MATERIAL... NO-OX-ID handles easier—coating more feet of pipe per man-hour because less material is required. Fewer "dope" kettles, trucks and "cats" are needed.

COATING CREWS PREFER NO-OX-ID... because there are no irritating or noxious fumes, coating crews like working with NO-OX-ID.

Write for booklet "Protecting Underground Pipe from Corrosion" for detailed information on NO-OX-ID combinations.

Dearborn NO-OX-ID CASING FILLER FOR PIPELINE CROSSINGS

Write For Bulletin 3079.

NO-OX-ID CM Casing Filler protects against corrosion wherever pipelines are cased beneath highway and railroad crossings. More than just an oil or petroleum product, it (1) contains additives; inhibitors and wetting agents; (2) has water displacing properties up to 5% its own weight; (3) is applied at 150° temperature, solidifies to a firm jell, completely sealing off the annular space, but permitting detection of leaks; (4) serves as an electrical insulator; (5) is economical to apply.

Dearborn
TRADE MARK
DEARBORN CHEMICAL COMPANY
MERCHANDISE MART PLAZA
CHICAGO 54, ILLINOIS

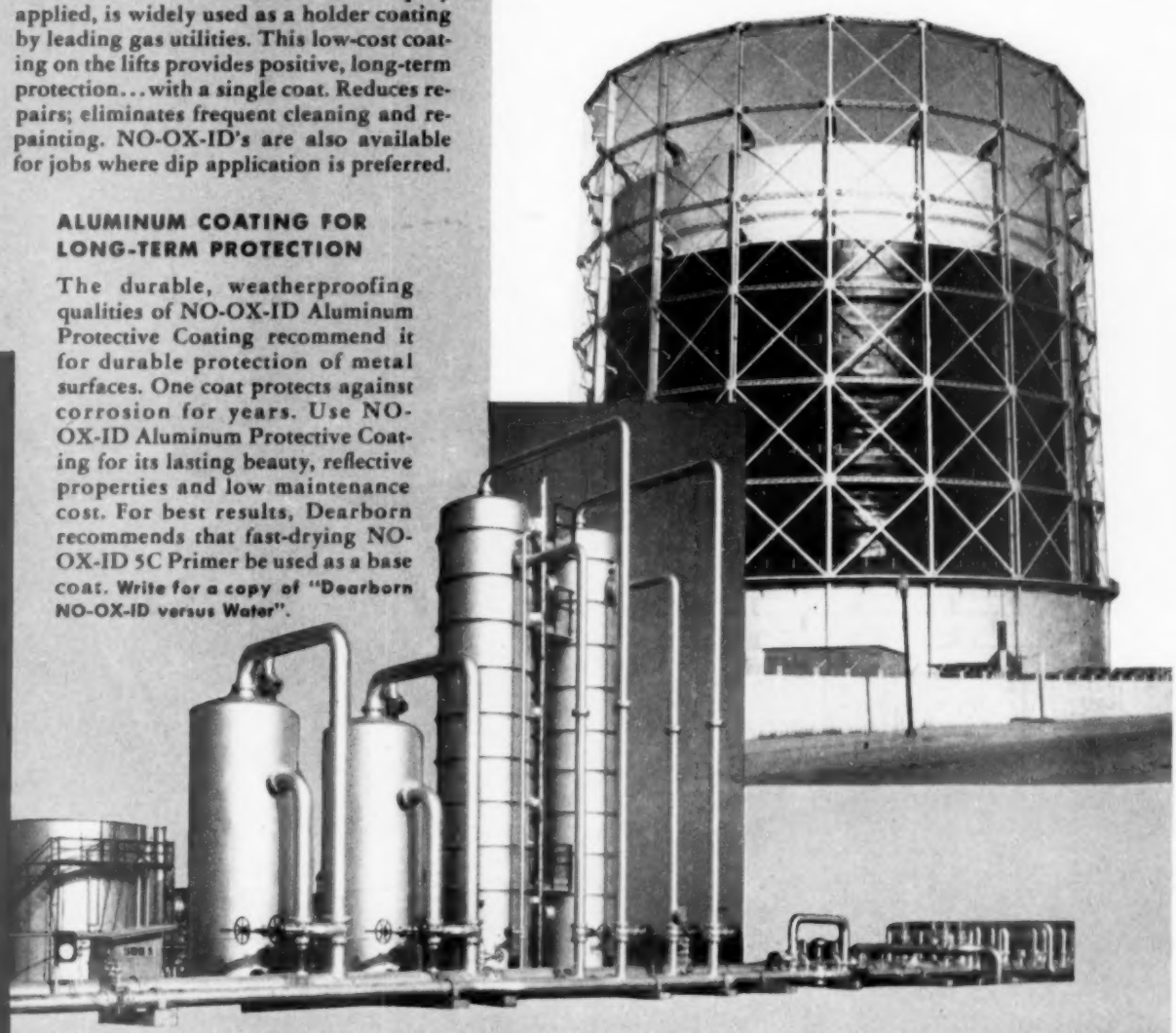
THE ORIGINAL RUST PREVENTIVE
NO-OX-ID

LASTING PROTECTION FOR GAS HOLDERS

NO-OX-ID "A" SPECIAL, brush or spray applied, is widely used as a holder coating by leading gas utilities. This low-cost coating on the lifts provides positive, long-term protection... with a single coat. Reduces repairs; eliminates frequent cleaning and repainting. NO-OX-ID's are also available for jobs where dip application is preferred.

ALUMINUM COATING FOR LONG-TERM PROTECTION

The durable, weatherproofing qualities of NO-OX-ID Aluminum Protective Coating recommend it for durable protection of metal surfaces. One coat protects against corrosion for years. Use NO-OX-ID Aluminum Protective Coating for its lasting beauty, reflective properties and low maintenance cost. For best results, Dearborn recommends that fast-drying NO-OX-ID 5C Primer be used as a base coat. **Write for a copy of "Dearborn NO-OX-ID versus Water".**



NEWLY ORGANIZED *Dearborn* PIPELINE SERVICE DIVISION

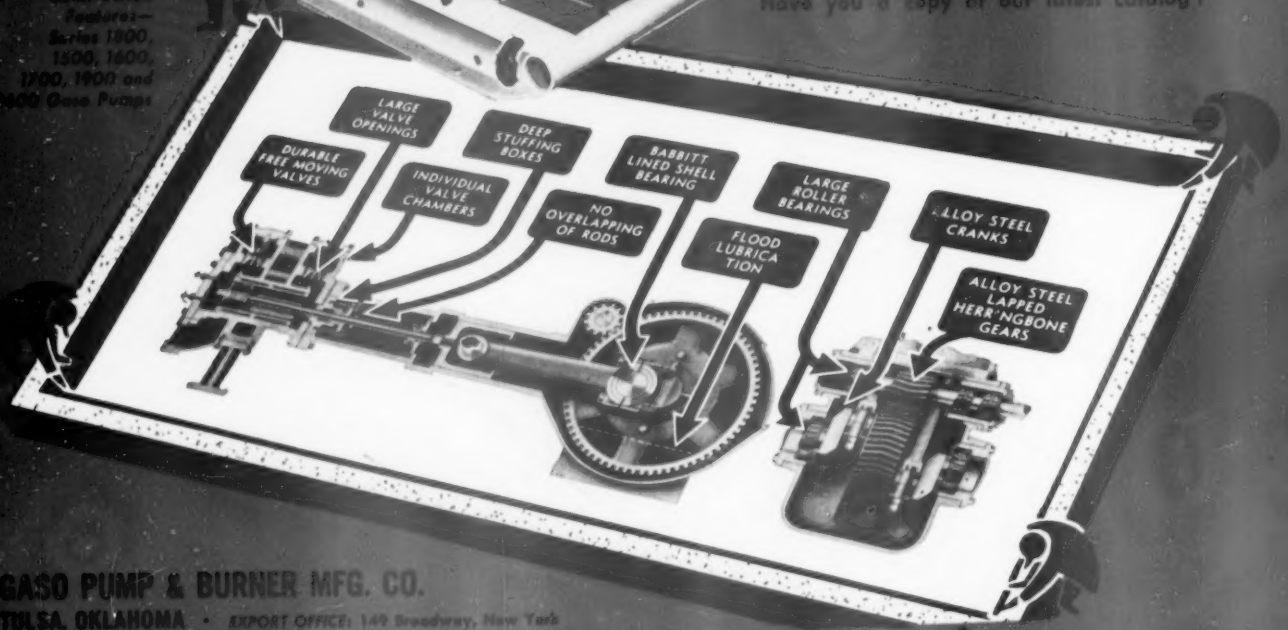
To better serve its many pipeline customers, Dearborn recently organized the Pipeline Technical Service Department to handle technical problems dealing with transmission and distribution systems coating materials. You are invited to take advantage of this added Dearborn service on any pipeline problem. Just call your Dearborn representative.

know your ***Dearborn*** *engineer* Your Dearborn engineer will bring you all the details on NO-OX-ID ALUMINUM PROTECTIVE COATING • NO-OX-ID 5C PRIMER NO-OX-ID CASING FILLER • NO-OX-ID "A" SPECIAL.

The Foundation of GASO LEADERSHIP *-Sound Engineering*

Typical Construction Features— Series 1800, 1500, 1600, 1700, 1900 and 2600 Gaso Pumps

Studying the life expectancy of mechanical equipment, pipe line company accountants are usually amazed by the service records of Gaso Pumps. We appreciate the compliment but see no reason for the amazement. Wouldn't it be even more amazing if, having studied the pumping needs of the oil industry for nearly 40 years, we didn't engineer our product to deliver an absolute maximum of trouble-free, low-cost performance? Have you a copy of our latest catalog?

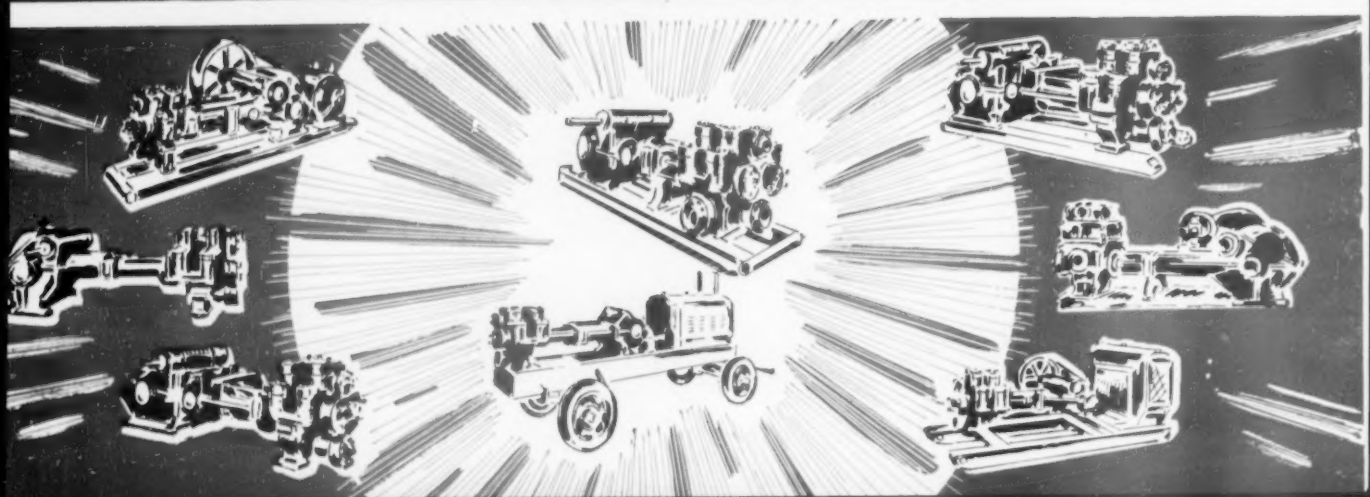


GASO PUMP & BURNER MFG. CO.

TULSA, OKLAHOMA · *EXPORT OFFICE:* 149 Broadway, New York

LUFKIN MACHINE CO., Ltd., Edmonton, Alberta
W. L. SOMMER COMPANY, Shreveport, Louisiana
Tinsley, Mississippi • Brookhaven, Mississippi • Odessa, Texas
BUDA ENGINE & EQUIPMENT CO., Los Angeles, Calif. Long Beach, Calif. • Bakersfield, Calif.
NORTEX ENGINE & EQUIPMENT CO., Wichita Falls, Texas
LUFKIN FOUNDRY & MACHINE CO., Casper, Wyoming

GASO PUMPS for every oil industry need



Grady Foster, R. O. Brehm, C. Pratas, W. E. Rutledge, A. B. Grant, Joe Rucker, E. E. Childress, R. E. Spriggs, and J. Ellis.

Gray, Strait Switch Posts At Security Engineering

W. C. Gray, who for the past 10 months has been Security Engineering Division's Gulf Coast manager, has been transferred to the post of Oklahoma division manager, while Clarence Strait, former Oklahoma division manager, moves to the Gulf Coast division-manager post. A. M. Birnie, general sales manager of Security, made the announcement.

W. C. GRAY

C. STRAIT

Gray first joined Security in 1945. He has served as sales manager for the Oklahoma division, Gulf Coast division, and Security Engineering, Ltd., at Edmonton, Alta., Canada.

Strait came to Security in 1948, working first as district sales manager, and later as assistant division manager in the Houston office. In 1952 he moved to Oklahoma to become divisional sales manager for that territory.

Rockwell Announces Meter Retirement Contest

Rockwell Manufacturing Co. has announced the sponsorship of a nation-wide contest for persons employed in the gas industry on the general subject of planned meter-retirement programs in the industry.

More than $5,000 in prize values, consisting of Delta power tools, will be awarded to winners in two categories. The first category will be for an essay not exceeding 2,000 words in length on the subject. "The Economics of a Planned Meter - Retirement Program." The second category will consist of filling in the last line of a jingle.

First prize for the essay contest will be a complete shop of Delta industrial-type power tools and accessories valued at $1,750. Second prize will be a complete shop of Delta Homecraft power tools and accessories valued in excess of $1,100. Four honor awards

For Easiest Pipe Threading ...it's a "504"

RIDGID

1 Set of Dies Threads 1" to 2" Pipe

- Instant change to 1", 1¼", 1½" or 2" pipe regardless of position of quick-opening lever.
- Wide open easy-to-read size bar . . . adjustable to over and undersize threads.
- Quick-opening lever retracts dies instantly without stopping power drive—no slow backing off.
- 4-jaw workholder centers pipe for accurate threading—no lead screw to jam.

For unmatched easy, fast, clean threading with your power drive, buy precision-made RIDGID 504 at your Supply House.

THE RIDGE TOOL COMPANY • ELYRIA, OHIO

RIDGID
Work-Saver Pipe Tools

You can blind

RIGID *lines*

the speedy, cost-cutting way...

WITH

HAMER

Visible Shut-off

RIGID

LINE BLIND VALVES

HAMER *Plug Valves*

Thousands of users have proven the easy and immediate operation of HAMER plug valves. Will not stick or freeze.

Hamer "Rigid" Line Blinds solve the problem of blinding pipe lines where no endwise movement of the line is possible. An internal sleeve, actuated by ball-bearing ring gear, takes all movement. Rigid body is unaffected by misalignment or line strains. Enclosed plate slot prevents spillage— stops mess, fire hazard. Blind is easily opened, or closed by one man in one minute.

Send for free catalog.

HAMER OIL TOOL COMPANY

2919 Gardenia Avenue

Long Beach 6, California

Representatives throughout the United States

each consisting of a $386 Deltashop and accessories will also be made.

In the jingle contest, first prize will be a Deltashop and accessories; second prize a $207 Delta saw-and-jointer combination, and third prize a $172 Delta 11-in. drill press and accessories.

In the essay contest, entrants may cite actual examples of meter-retirement and repair programs with supporting figures to document their entries, or they may present their own thinking with regard to meter-repair and retirement practices in the gas industry.

The jingle which must be completed is as follows:

Programed meter replacement, if it's not neglected
Will keep you and your customers fully protected.
Repairing worn meters can frequently be
A false and expensive economy.
Planned scrapping of "antiques," smart meter men say
(This line to be filled in by contestant)

Only those persons employed by gas utilities or those associated with gas utilities as consultants are eligible to participate. The contest closes at midnight, April 30, 1954. Further information may be obtained by writing Rockwell Manufacturing Co., Gas Meter Contest, 400 North Lexington Avenue, Pittsburgh.

A. V. Smith Boosts Meany

A. V. Smith Engineering Co., Ardmore, Pa., corrosion consultant, has announced the appointment of J. J. Meany to vice president. In this capacity he will be responsible for corrosion studies in the field.

J. J. MEANY

Powell To Head Carboloy's Allegheny District

C. W. Powell, manager of the Pittsburgh branch sales office of Carboloy Department of General Electric Co., has been named manager of the newly created Allegheny district. The district office is located at Pittsburgh.

Powell received an A.B. degree from DePauw University in 1953. He joined General Electric 2 years later, as a service representative, and in 1943 joined Carboloy and was active in organizing Carboloy's distributor sales organizations. He was named Pittsburgh branch manager in July 1951.

Norton Announces Two New Refractory Appointments

Norton Co., of Worcester, Mass., has announced two appointments in its refractory sales organization. William F.

W. WINEMILLER

J. L. MILLER

Winemiller has been named manager of the sales engineering department of the refractories division. James L. Miller has been appointed a refractories engineer, responsible for a new territory consisting of Missouri and all of Illinois south of Chicago.

Winemiller, who was formerly chief sales engineer, has been with Norton since 1947.

Miller has been with Norton since 1951, and prior to his present appointment, he was a member of the refractory sales engineering department.

James K. Stevenson will continue to handle all refractory accounts in the northern part of Illinois and the states of Iowa, Wisconsin, and Minnesota.

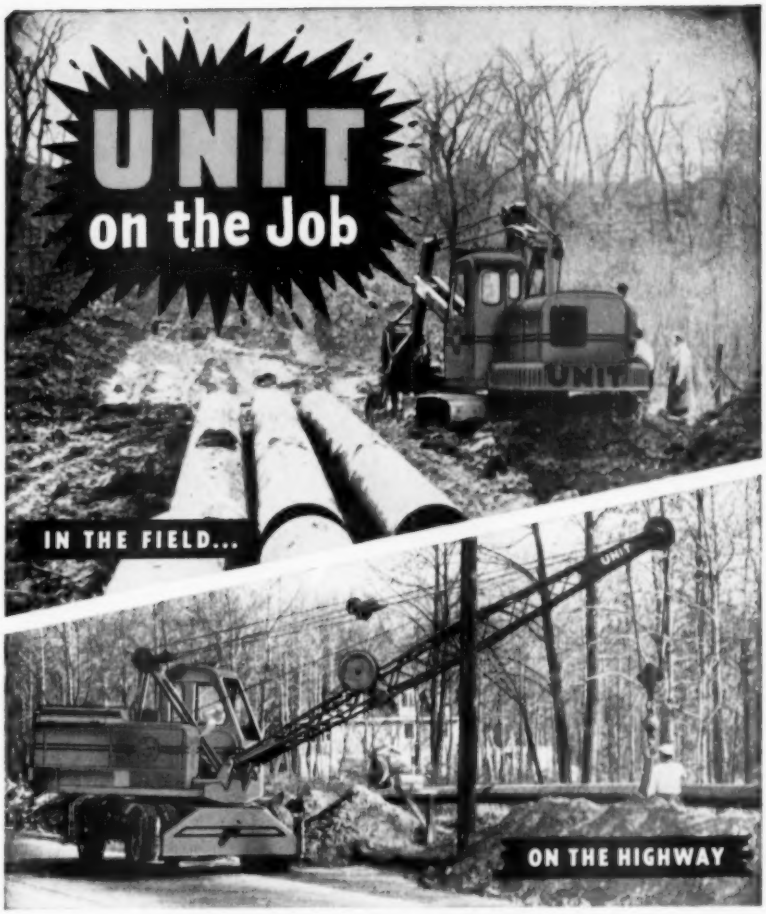
Pacific Pumps Cites Long Service Installation

Ernest Wilhelm, Pacific Pumps service engineer, flew to Palembang, Indonesia, recently on an emergency refinery pump repair job. The two high-pressure centrifugal pumps requiring repair have a remarkable refinery service record. Since their installation in 1934 in the Sungai-Gerong refinery at Palembang, they have been in constant operation handling approximately 20,000 bbl. of crude a day, including a service tenure under Japanese occupational personnel. Wilhelm plans on putting both pumps in top condition within a 2-week period.

Chiksan Executives Return From Canadian Tour

G. R. Winder, vice president and general manager, and K. K. Knutzen, secretary-treasurer and comptroller of Chiksan Co., have just returned to Brea, Calif., after a 2-week trip to Chiksan of Canada, Ltd., a subsidiary of Chiksan Co.

During their stay in Canada, Winder and Knutzen visited the Edmonton



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In the field where the going is tough, UNIT TRENCHOES have the traction and power for continuous ditching to meet pipeline schedules. For laying pipeline along the right-of-way, where the going is smooth, the self-propelled mobile UNIT offers road travel speed, plus accurate lift and swing control. Designed for speed and stability, UNIT crawler and mobile equipment are built to meet every trenching and handling job required in pipeline construction work.

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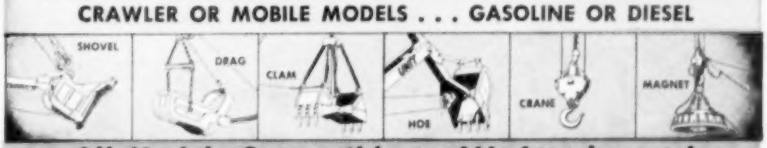
½ or ¾ YARD EXCAVATORS...CRANES UP TO 20 TONS CAPACITY
CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL



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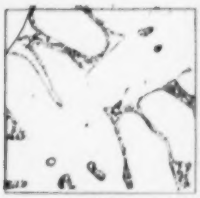
YOU'LL MAKE MORE PROFIT WHEN YOU

FIGHT CORROSION

with ESCO Heat-Treated High Alloy Steel Castings



BEFORE

AFTER

These photomicrographs illustrate importance of proper heat treatment in "locking" carbides in solution to produce extra high corrosion resistance.

Laboratory accelerated corrosion test checks result of heat treatment.

ESCO ALLOY CASTINGS OUTLAST OTHERS MANY TIMES!

A Wide Range of ESCO High Alloy Products Is Available for critical conditions of Heat and Corrosion.

- Pipe and Flanges
- Heavy-Duty Valves
- Standard and Special-Flanged Fittings
- Screwed Fittings
- Welding Fittings
- Kiln Cooler and Dryer Parts
- Refinery Castings
- Heat-Treating Parts
- Conveyor Chains

A big reason for the *unusually high* corrosion resistance of *ESCO* Alloy steel castings is the advanced technique of heat-treating and water quench developed at *ESCO*. It takes only *30 seconds* for a load of steel castings to pass from the oven into an 8000-cubic-foot water quenching tank! Capacity, and speed of quench illustrates a typical *ESCO* answer to a tough production problem. For only with such facilities can you be assured the uniformly high corrosion resistance of *ESCO* Stainless steels.

ESCO has solved many tough heat and corrosion problems for industry as part of its application engineering and foundry service! *ESCO* maintains one of the largest foundry metallurgical laboratories in the country to help you with really tough corrosion problems. Your inquiry is invited. Write for full details or ask for informative Brochure *175*.

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Offices and Warehouses: Honolulu, Hawaii; Houston, Texas; New York, New York; Los Angeles, San Francisco, California; Seattle, Spokane, Washington; Centralia, Pennsylvania; Eugene, Medford, Oregon; Salt Lake City, Utah. In Canada: Vancouver, B. C., and Toronto, Ontario.

ELECTRIC STEEL FOUNDRY CO.

2181 N.W. 25TH AVE., PORTLAND 10, ORE. 712 PORTER ST., DANVILLE, ILL.

and Calgary offices of the Canadian subsidiary, and called on major customers and prospects with Jack Runnels, Western Canadian district manager, and David Cormack, sales representative. Stops were also made in Seattle to visit E. C. Griffin Co., a Chiksan representative, and at Chiksan's Oakland office in charge of Hal Stock.

Selas Establishes New Constructors Firm

Selas Corp. of America, processing engineers and manufacturers for industry, at Philadelphia, has formed a new subsidiary, Selas Constructors, Inc., Houston.

F. O. Hess, president of both corporations, announced that Clare Constructors Co., Houston, has been acquired as the nucleus of Selas Constructors, Inc., and that the former owner, R. T. Clare, Jr., will be its general manager and vice president.

The purpose of the new company is to facilitate fabrication, erection, and service of Selas Corp. designs and developments for the petroleum and petrochemical industries of the Southwest. A heavy backlog of orders is responsible for this expansion, which will benefit industrial customers by important freight and other savings. K. W. Fleischer, manager of the fluid processing division of Selas Corp., will also be responsible for designs as engineering vice president of Selas Constructors.

Hewitt-Robins Makes Pew Head of Seven-State Area

John W. Pew, formerly district manager for Houston sales area of Hewitt-Robins, Inc., has been named manager of the seven-state South Central sales division, with headquarters in Houston. R. E. Johnson, field engineer in the company's Virginia district, has been appointed manager of the Houston district, reporting to Pew.

Pew began work with Hewitt-Robins in 1936 as an inspector at the company's Buffalo plant. Following service in the U. S. Army, he returned to the company in 1945 as a field engineer, and in 1951 was promoted to manager of rubber and conveyor sales for the Houston district.

New Supply Firm to Act As H. C. Smith Distributor

Formation of Petroleum Industry Supply Co., Inc., to be exclusive distributor of H. C. Smith rock bits and hole openers throughout Peru, Bolivia, Chile, Brazil, and Ecuador, has been an-

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THE NEW JONES TYPE 1 SUCKER ROD

A New Nickel Alloy Rod Recommended for Medium to Heavy Loads in Mildly Corrosive Fluid

- **FULLY NORMALIZED**
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nounced by the new supply company's president and general manager, Ray Polle. Associated with Poole is Ing. Manuel Carrera V., who will be vice president and Northern division manager. The supply company's headquarters will be located in Lima, Peru, and branches will be maintained in Piura and Paita, Peru.

New Regional Divisions Announced by Lufkin Rule

E. H. Meibeyer, vice president of The Lufkin Rule Co., has announced that the company has established two new regional sales divisions, which, together with the New York division and the West Coast division, divide the country into four sales areas for the company.

William F. Rockwell will be sales manager of the new East Central Division. He started with Lufkin in 1934, and has worked out of the New York office and has been district sales manager of the Pittsburgh territory.

D. F. Oltz will be sales manager of the new West Central division. He was merchandise manager of the Duluth branch when he left Marshall Wells Co. in 1951 to join the Lufkin sales department at the home office.

In order better to coordinate administrative matters in the sales department, Thomas W. Wise has been made assistant to Meibeyer.

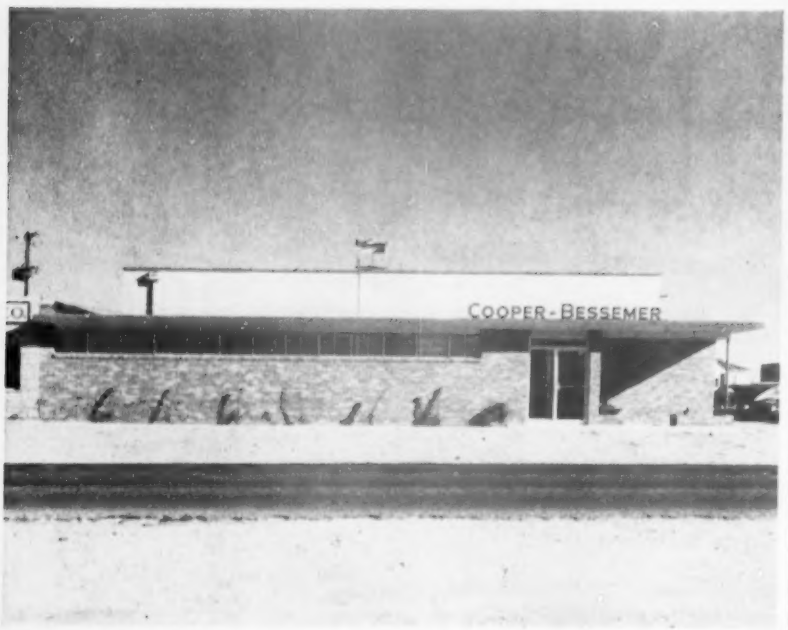
Swartwout Changes Sales Service in California

The Swartwout Co. has announced that its Los Angeles district office will handle all sales and service matters pertaining to the company's Autronic Control and Power Plant Equipment Divisions, including special accounts previously handled by Charles P. Crowley.

The office, which services southern California, Arizona, and Clark County, Nevada, is under the direction of Roger P. Gilliland.

Lane-Wells Co. Opens Montana Sales Office

To serve customers better in Montana, Lane-Wells Co. has opened a new sales office at Billings. Don Bishop has been transferred from Casper, Wyo., as district sales engineer. This will bring the total of sales and service branches to 75 in the United States.

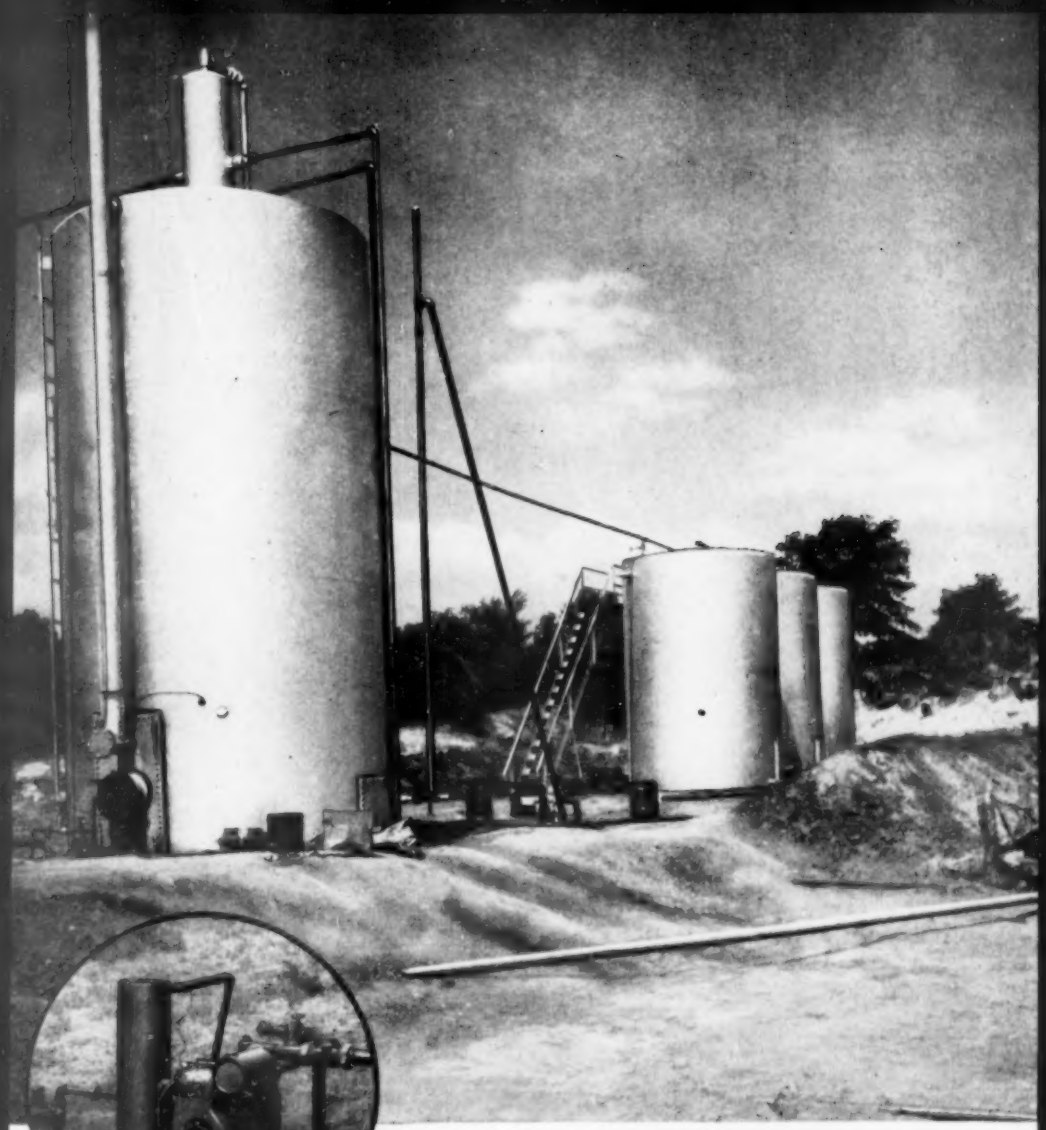


Cooper-Bessemer's Odessa Office Has New Building

Expanded field service facilities are housed in this brick building constructed by Cooper-Bessemer at Odessa, Tex. Under the direction of A. W. Abel, branch manager, this new structure houses 1,715 sq. ft. of office space and 3,725 sq. ft. of warehouse area. Serving the warehouse facilities is a 2-ton traveling crane for expediting delivery of heavy engine and compressor parts to the Texas area. The new structure is part of Cooper-Bessemer's program to form closer working relationship between the factory and users of diesel and gas engines and compressors, according to Stanley E. Johnson, Cooper-Bessemer's vice president in charge of sales.

guaranteed to perform!

MARLOW PUMPS • RIDGEWOOD, NEW JERSEY



Additional profits for operators everywhere are realized by recovering good, useable oil from basic sediment and water. Pumping from storage tank bottoms to heater treaters to save the oil normally burned each year in slush pits, is one of many jobs Marlow Self-Priming Centrifugal Pumps do quickly and efficiently throughout the oil country.

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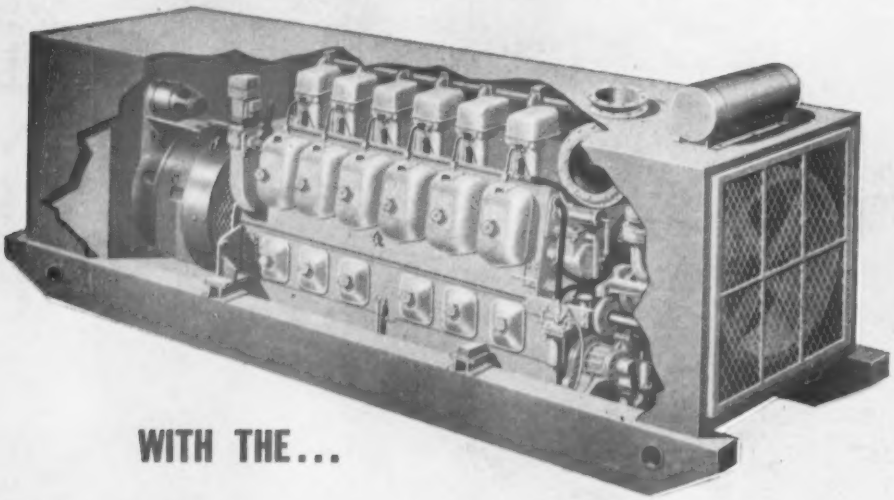
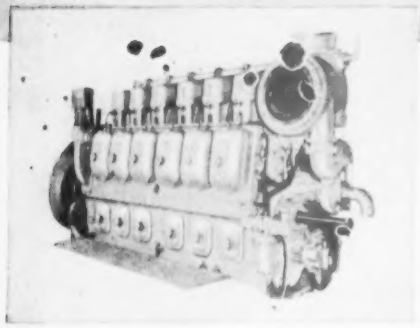
Marlow Self-Priming Pumps and Marlow "Mud Hog" Diaphragm Pumps make a team that can't be beat for tough oil-country pumping jobs. Marlows have proved their durability for majors and independents alike on rugged trouble-free service. Veteran oil men are making Marlow their first choice for long, dependable service. Make sure with Marlow . . . get the facts from your Marlow dealer or write for Bulletin O-53.

DEPENDABLE POWER
WHERE YOU WANT IT, WHEN YOU WANT IT



WITH THE...

NEW, PORTABLE ALCO DIESEL ELECTRIC GENERATOR UNIT



Alco 6-cylinder, 9" x 10½" (251-A), 4-cycle, turbo-charged diesel engine, dry weight 21,350 lbs. Twelve— and 16-cylinder engines also available.

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- ★ Power during construction or repair
- ★ Supplemental power during peak periods
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- ★ Scores of other municipal and industrial uses

Here's the answer to your demand for a compact, economical power generating unit for emergency, temporary or standby service.

A completely self-sufficient power plant, the new, portable Alco Diesel Electric Generator unit consists of a 9" x 10½", 4-cycle turbocharged Alco diesel engine, in sizes ranging from 390 to 1300 kw, with all necessary auxiliary equipment.

It can be rail-mounted for electric power *where* you want it, *when* you want it. It can be installed permanently for applications such as standby service in hospitals and municipal power plants.

Either way, it puts dependable power at your immediate call twenty-four hours a day.

Let us tell you more about this versatile new unit in terms of your own operations. Write or phone your nearest Alco sales representative today for complete information. Offices in New York, Beaumont, Chicago, Cleveland, Houston, Kansas City, San Francisco, Schenectady and St. Louis.

ALCO DIESELS

AMERICAN LOCOMOTIVE COMPANY
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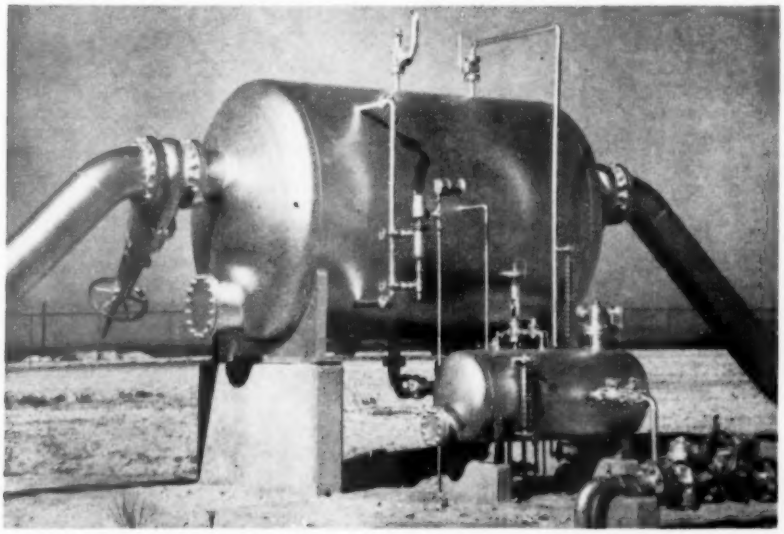
Pipe-Line Patrol

. . . Report on Construction



New Gas-Treating Facilities

INDICATIVE of new trends in gas-treating facilities on natural-gas pipeline systems is this installation at the Cree Sikes plant, Runnels Gas Products Corp., Runnels County, Texas. Pictured here are a scrubber and gas trap on the main inlet gas line from the field to the cycling plant.

Under Way, Contracted, and Planned . . .

PIPE-LINE activity as reported below by The Oil and Gas Journal is compiled from information received from pipe-line companies and contracting firms.

These projects include those planned, proposed, under way, and contracted. Uncontracted projects are indicated by a • preceding the company name.

Crude-Oil Pipe Lines

• **California - Oregon Pipe Line System**—103 miles 6-in., proposed, Crescent City, Calif., to Medford, Ore.

• **Cities Service Pipe Line Co.**—60 miles, 12-in., begin March 1954, Houston to Sour Lake, Tex.

Gulf Refining Co.—63 miles, 8-10-in., under way, Lea County, New Mexico, to Anderson and Denton fields. 1-54.

Magnolia Pipe Line Co.—56 miles, 8-in., contracted, Seminole, Tex., to Gladiola Junction, N. M. Completion date 2-54.

• **Michi, Inc.**—10-in., planned, Highland, Ind. to Kalamazoo, Alma, and Elsie, Mich.

• **Pasotex Pipe Line Co.**—146 miles, 10-in., under way, Snyder to Wink, Tex. 2-1-54.

Phillips Pipe Line Co.—18 miles, under way, gathering lines, northeast area of Andrews County, Texas.

• **Progress Pacific Pipeline Co.**—1,100 miles, 24-in., planned, Odessa, Tex., to Los Angeles, Harbor, Calif.

• **Roosevelt Oil & Refining Corp.**—22 miles, 4 and 6-in., planned St. Helen to Norwich, Mich.

• **Sinclair Pipe Line Co.**—20 miles, 12-16-in., planned, Monee to Blue Island, Ill. Completion date 4-54.

• **Sioux Pipe Line System.**—Under study by Shell Pipe Line Corp. for group of 12 Williston basin producers. Length of line, pipe size, and terminal point pending final report by Shell.

Texas New Mexico Pipe Line Co.—52 miles, 10-in., under way, Dawson County to Basin System. McVean & Barlow.

Texas Pipe Line Co.—65 miles, 4-6-8-12-in., under way, South Louisiana. Panama-Williams.

Golden Meadow to Houma, La. Panama-Williams.

Gathering lines in Leeville, Bay De Chene and Golden Meadow pools. Panama-Williams.

• **West Coast Pipeline Co.**—960 miles, 20-22-in., planned. Wink, Tex., to Norwalk, Calif.

Products Pipe Lines

Badger Pipe Line Co.—215 miles, 8-10-12-in., begin Spring '54, East Chicago, Ind., to Madison, Wis. (Joint project of Cities Service Oil Co., Sinclair Pipe Line Co., Pure Oil Co., and The Texas Co.)

• **H. W. Bass & Sons, Inc.**—152 miles, 4-6-

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Made in 3 sizes ranging from 60,000 to 150,000 pounds capacity. Quick, safe means of connection has made them very popular in all major fields. Sold through leading supply stores everywhere.

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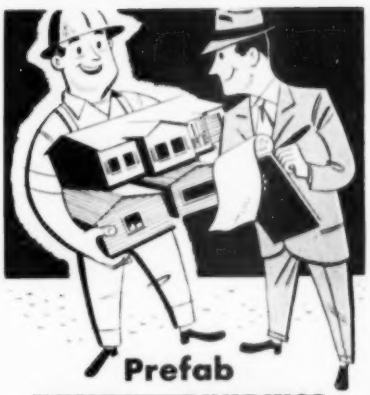

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in., proposed. Duval and Live Oak counties, Texas, to Corpus Christi, Tex.

Frontier Ref. Co.—6-in., planned, Cheyenne, Wyo., to North Platte, Neb.

• **Great Lakes Pipe Line Co.**—Planned, extension 130 miles, 8-in., Nebraska City to Grand Island, Neb.

Harbor Products Systems—86 miles, 16-in., under way, Woodbury Junction, Philadelphia to Trembley Point, N. J. Construction Service Co. and H. C. Price Co. (Joint ownership of Sinclair Pipe Line Co., Gulf Refining Co., and Texas Pipe Line Co.) Completion date 1-54.

• **International Pipe Line, Inc.**—132 miles, 8-in., proposed, Wrenshall to Minneapolis, Minn.

Oklahoma Mississippi River Products Line, Inc.—475 miles, 12-in., under way, Duncan, Okla., to West Memphis, Ark. Ford, Bacon & Davis Const. Corp.

Under way, White River to Allen, Okla. River Const. Co. Completion date 6-30-54.

Under way, Allen to Duncan, Okla. River Constr. Corp. Completion date 6-30-54.

• **Phillips Petroleum Co.**—54 miles, 6-in., planned, Goldsmith to Borger, Tex.

52 miles, 10-in., planned, Shell's Brookshire system to Sweeny, Tex.

• **Triangle Pipe Line Co.**—560 miles, proposed, Arkansas City, Ark., to Covington, Ky., and Nashville, Tenn.

U. S. Gov't. Alaskan Products Pipe Line.—600 miles, 8-in., under way, Haines northward through British Columbia and Yukon to Fairbanks, Alaska. Williams Bros., McLaughlin, Inc., and Marwell Const. Co. Completion date 9-55.

• **United States Pipe Line Co.**—1,799 miles, 22-26-in., proposed, Beaumont, Tex., to Newark, N. J.

Beaumont, Tex., to Memphis, Tenn.
Memphis, Tenn., to Louisville, Ky.
Louisville, Ky., to Newark, N. J.
Laterals to Paducah and Lexington, Ky.

Williston Basin Pipe Line Co.—250 miles, 8-in., under way, Laurel-Billings, Mont., refineries to Glendive, Mont.

Wolverine Pipe Line System—200 miles, 14-in., under way, Chicago-Toledo-Detroit. (Joint ownership of Shell, Texas, and Cities Service.) Anderson Bros. and Midwestern Constructors, Inc. Completion date 1-54.

East Chicago, Ind., to Kalamazoo River. Midwestern Constructors, Inc.

Yellowstone Pipe Line Co.—(Continental Oil Co., Interstate Oil Pipe Line Co., Union Oil Co., and H. Earl Clack interest) 540 miles, 10-in., contracted, Billings, Mont., to Spokane, Wash. 9-54.

Billings to Bozeman, Mont. Ross and Powers.

Bozeman to Helena and on to Clinton, Mont. Associated Pipe Line Contractors, Inc.

Clinton to Perma, Mont. Associated Pipe Line Contractors, Inc.

Clinton to Perma, Mont. Eastern Pipe Line Fields Service Co.

Perma, Mont., to Murray, Idaho. Eastern Pipe Line Field Service Co.

Murray, Idaho to Spokane, Wash. Engrs. Limited Pipe Line Co.

Natural-Gas Pipe Lines

• **American-Louisiana Pipe Line Co.**—1,121 miles of 30 and 22-in., 30-in. extends from North Tepetate, Acadia Parish, Louisiana, to near Detroit. The 22-in. starts near Payne, Ohio, extends to Bridgman, Mich. Estimated cost: $130,000,000.

Arkansas-Louisiana Gas Co.—107 miles, 8-24-in., proposed, Arkansas, Louisiana, and Texas.

• **Arkansas-Missouri Power Co.** — 140 miles, 2 to 10-in., planned, St. Francis River, Clay County, Arkansas, to near Campbell, Mo.

• **Associated Natural Gas Co.**—88 miles, proposed, Missouri.

• **Atlantic Seaboard and Virginia Gas** Transmission.—116 miles, 26-in., proposed, loops along Cobb, W. Va., to near Baltimore, Md.

Buzzards Bay Gas Co.—28 miles, 8-in., under way, Hyannis, Mass., to Bourne Bridge, Mass. Hallen Co., Inc. Completion date 2-54.

• **Carolina Natural Gas Corp.**—185 miles, 2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

Chicago District Pipe Line Co.—19 miles of 36 and 30-in., completed of 35 miles planned. Remainder, all 30-in., will be completed in 1954.

• **City of Fayette, Ala.**—20 miles, 5-in., proposed, Fayette, Ala., to Southern Natural's system in Tuscaloosa County, Ala.

City of Dallas, Ga.—8 and 4½-in., distribution system. Engineering & Const. Co 1954.

• **Coast Counties Gas & Electric Co.**—40 miles, 3, 4, and 8-in., planned. Coast and Valley region, California.

• **Colorado Interstate Gas Co.**—365 miles, 22-in., proposed, Green River, Wyo., to Denver, Colo. 1954.

49 miles, 20-in., proposed, Morton County, Kansas, to near Hooker, Okla.

Colorado Interstate Gas Co.—70 miles, 20-4-in., under way, gas-gathering system in Kansas. Engineering & Const. Co. 1-1-54.

243 miles, 4 to 20-in., under way, Colorado, Oklahoma, Texas, and Kansas. Engineering Const. and Z. J. Graham.

• **Cumberland and Allegheny Gas Co.**—31 miles, 12-in., proposed, Garrett County, Md., to Keyser, W. Va.

East Tennessee Natural Gas Co.—96 miles, 16-in., under way, Knoxville, Tenn., to Kent line. Engineering & Const. Co. 1-1-54.

54 miles, 4-12-in., under way, laterals off main line from Knoxville, Tenn., to Kent line. Engineering & Const. Co. 1-1-54.

• **El Paso Natural Gas Co.**—1,178 miles, under way, Permian basin, New Mexico, Texas and Colorado. Spring '54.

El Paso Natural Gas Co.—771 miles, 30 in., under way, Plains, Tex., to Kingman, Ariz.

Section 1—Under way, Plains, Tex., to Corona, N. M. Oklahoma Const. Co.

Section 2—Under way, Corona to Suwanee, N. M. R. H. Fulton.

Section 3—Under way, Suwanee to Gallup, N. M. R. H. Fulton.

Section 4-5—Under way, edge to Navajo Reservation east to Flagstaff on to Kingman, Ariz. Western Pipe Line Const., Inc. Completion date 2-54.

Under way, across Navajo Reservation connecting sections 3, 4, and 5. El Paso Co crews.

Under way, Spraberry fields, El Paso Co crews.

• **Fort Worth Basin Gas Co.**—Planned, Novice, through Brown and Comanche counties, Texas.

• **Glacier Gas Co.**—285 miles, 20-in., proposed, Kalispell, Mont., to Spokane, Wash.

120 miles, 16-in., proposed, Spokane to Hanford, Wash.

91 miles, 8⅝-in., proposed, Spokane to Lewiston, Idaho.

130 miles, 12¾-in., proposed, Spokane to International boundary at Trail, British Columbia.

Gulf Interstate Gas Co.—860 miles, 30-in., under way. Acadia Parish, La., to Boyd County, Ky. H. C. Price and Houston Contracting. 11-54.

Under way, Rayne, La., to Kincade, Tenn. Houston Contr. Completion date Spring 1954.

Under way, Gordonsburg, Tenn., to Catlettsburg, Ky. H. C. Price Co.

230 miles, gathering lines, under way. Associated Pipe Line Contractors, Anderson Bros., Williams Bros.

329 miles, 12 to 24-in., proposed. Laterals

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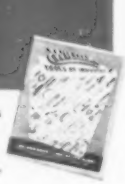
These wrenches are designed right . . . drop-forged from selected alloy steel for extra strength and durability. Wide range of patterns with openings from 3/16" to 3-1/8".

FOR BETTER PIPE WORK

Williams "Vulcan"® Reversible Drop-Forged Chain Pipe Tongs turn pipe in either direction instantly without removing tong or loosening chain. Newest of four styles of tongs and two styles of chain pipe vises. For both pipe and fittings 1/4 to 8".

WILLIAMS
INDUSTRIAL TOOLS
"The Broadest Line of Its Kind"



• Catalog 201 shows the complete line of Williams tools. Buy through your local supply store.

J. H. WILLIAMS & CO., 411 Vulcan St., Buffalo 7, N. Y.

off Acadia Parish, Louisiana, to Boyd County, Kentucky, line.

• **Home Gas Co.**—32 miles, 12-in., planned, Breesport to Union Center, N. Y.

17 miles, 12-in., proposed, loops from Hansock to Sanford, N. M.

• **Interstate Power Co.**—26 miles, 8-in., proposed, from Nat. Gas P. L. Co. America line near Hooppole, Ill., to Clinton, Iowa. Completed.

• **Lateral Gas Pipe Line Co.**—27 miles, 4½ in., proposed, from Grant to Clarinda, Ia. Estimated cost: $267,200.

• **Lone Star Gas Co.**—100 miles, proposed, storage fields to the Dallas-Fort Worth area.

35 miles, 12-in., proposed, southeastern Schleicher County.

Lone Star Gas Co.—44 miles, 12-in., under way, Red Springs, Woods County to Sulphur Springs area, Hopkins County, Texas.

• **Manufacturers Gas Light & Heat Co.**—40 miles, proposed, Allegheny, Washington, and Beaver counties, Pennsylvania.

213 miles, 3 to 26-in., proposed, various points on system in Pennsylvania, West Virginia, and Ohio.

72 miles, 16-20-in., proposed, Doddridge, Wetzel and Marshall counties, West Virginia.

• **Michigan Consolidated Gas Co.**—25 miles, 12-in., proposed, from near Sparta to Muskegon, Mich.

• **Michigan-Wisconsin Pipe Line Co.**—251 miles, proposed, 24, 18, 12, 6, and 4-in. loops. Majority will be in Illinois.

• **Mississippi River Fuel Corp.**—109 miles, 10-18-in., planned, laterals in Woodlawn and Waskom gas fields, Texas.

Missouri Central Gas Co.—25 miles, 6-in., contracted, Moberly to Macon, Mo. L. R. Young Const. Co.

• **Missouri Public Service Co.**—136 miles, 8-10-in., proposed, New Franklin to Trenton, Mo.

24 miles, 10-in., Johnson County to Clinton, Mo.

• **Montana Power Co.**—52 miles, 16-in., planned, Canada - Montana border to Cut Bank, Mont. Completed.

• **Natural Gas Producer, Inc.**—100 miles, 12-in., planned, Yenter pool to Denver, Colo.

Nevada Natural Gas Pipe Line Co.—114 miles, 10¾-in., under way, Topock, Ariz., to Las Vegas, Nev. R. H. Fulton, Completed.

• **New River Gas Co.**—50 miles, planned, Summers to Monroe counties, West Virginia, to Narrows and Dublin, W. Va.

• **Northern Indiana Fuel & Light Co.**—35 miles, 8-in., planned, Edgerton to Auburn, Ind.

• **Northern Natural Gas Co.**—458 miles, proposed, Kansas, Texas, Oklahoma, and Nebraska, Iowa, and Minnesota to connect with Permian Basin System.

475 miles, proposed branch lines to Iowa, Nebraska, Minnesota and South Dakota.

• **Northwest Alabama Gas District**—40 miles, 9-in., proposed, Southern Natural's line through Windfield to Haleyville, Ala.

• **Northwest Natural Gas Co.**—750 miles, planned, Washington, Oregon, and Idaho.

24-in., Eastport, Idaho, to Monroe, Wash.

18-in., Monroe to International boundary near Lynden, Wash.

22-in., Monroe to near Seattle, Wash.

20-in., Seattle to Portland, Ore.

• **Ohio Fuel Gas Co.**—31 miles, 20-in., planned, Licking County to Richland County, Ohio.

22 miles, 16-in., planned, Dayton, Troy, Piqua, and Sidney, Ohio.

23 miles, 16-20-in., planned, Wellington to Elyria, Ohio; 16 miles, 20-in., planned, Benton Station to Crawford Station; 18 miles, 20-in., Crawford Station to near Columbus; 16 miles, 16-in., planned, Berlin to Sandusky, Ohio.

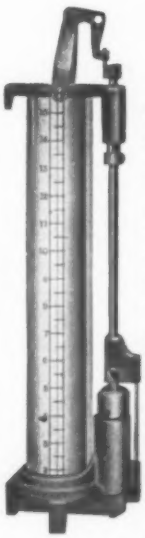
74 miles, 3 to 20-in., planned, Hocking, Knox, and Ashland counties, Ohio.

W. L. WALKER CO.

SINGLE TRIPPING

WALKER OIL THIEF

Cuts Gauging Time



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Other exclusive features include: a rotating valve seat to assure proper seating; encased springs to prevent fouling; trip mechanism which accommodates any length trip rod. Sturdily built for longer service. Available in five sizes: 12, 16, 18, 24 and 36 inches. Available through all supply stores.

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- CENTRIFUGE MACHINES
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Everything the gauger needs from one dependable source.

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Whether you have a new concrete floor or are refinishing an old one, the Multi-Clean Method is fast and economical. It fortifies concrete against abrasion and the devastating effects of excessive water, grease, oils, alkali, soaps and other chemicals. It prevents concrete dusting, pitting and chipping . . . gives you a hardened, completely sealed floor in a wide range of permanent non-fading colors and natural. You'll get better service and greater safety with added beauty and longer life from your concrete flooring when you use The Multi-Clean Method.

MULTI-CLEAN *cuts hours off maintenance time!*

The Multi-Clean Method saves many hours of floor maintenance time. Sweeping is easier, more effective and wet moppings become less frequent. Periodic steel wool buffing loosens stubborn dirt and restores the finish.

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Every floor care problem is answered in this 44-page handbook, packed with valuable information about floors and how to maintain them for lasting results and at lower costs.

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Multi-Clean Products, Inc.
2277 Ford Parkway, Dept. OG-1, St. Paul 1, Minnesota

Gentlemen: I would like this handbook and information on: ☐ Floor Machine, ☐ Floor Scrubber, ☐ Vacuum Cleaner. I'm interested in The Multi-Clean Method for: ☐ Concrete Floors; Floors.

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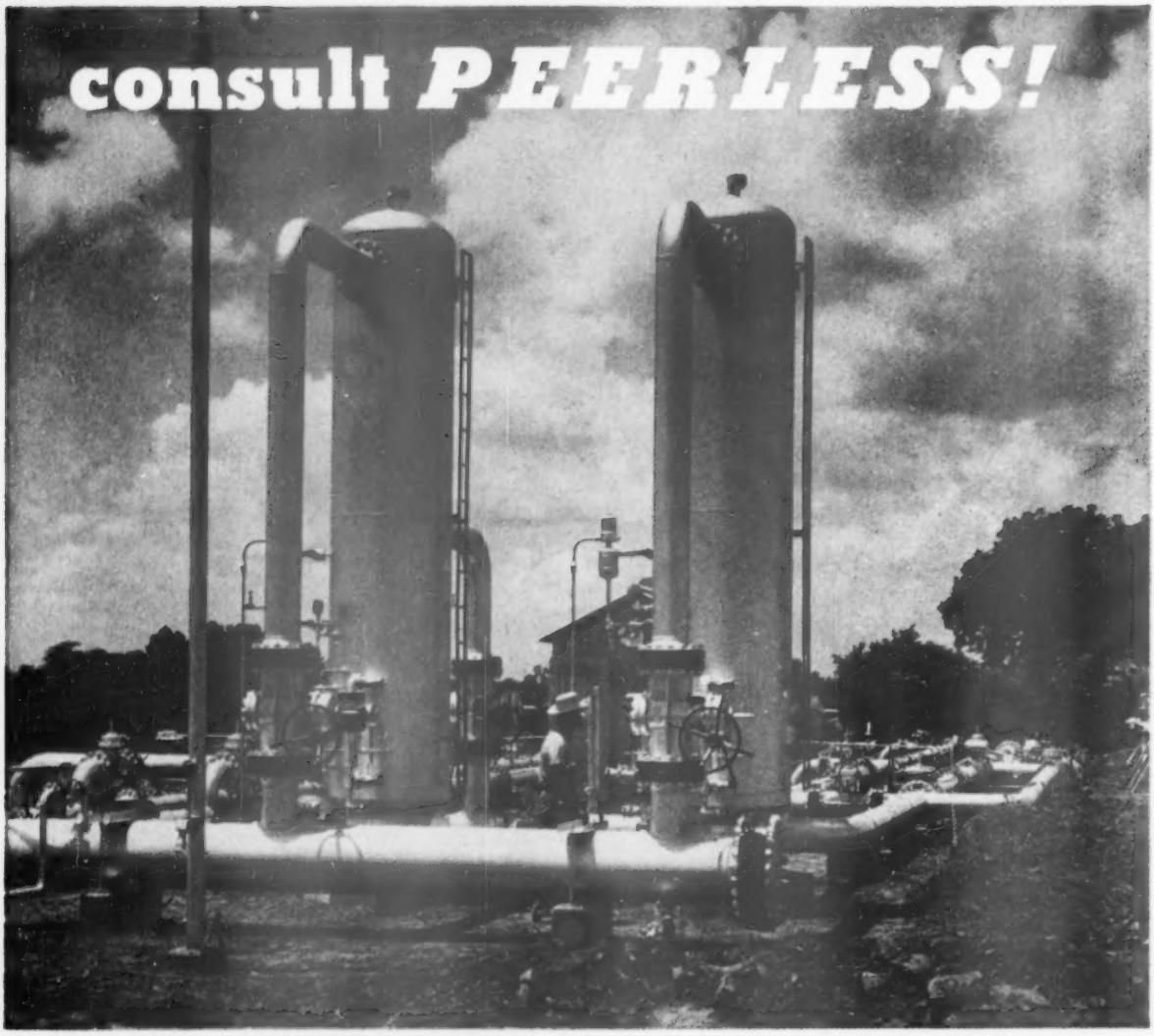
SEE MULTI-CLEAN IN ACTION — PLANT MAINTENANCE SHOW — BOOTH 1013

For GAS SCRUBBERS



The **BEST SCRUBBERS** for PIPELINES, GATHERING SYSTEMS, COMPRESSOR STATIONS, PLANT INLET SCRUBBERS

Pictured is an installation of TWO 42" x 15' Peerless Gas Scrubbers, at a new Pipeline Compressor Station, in Louisiana. This installation is typical of the many successful applications of Peerless Scrubbers.

Each Peerless Scrubber is designed and built around the famous Peerless Mist Extractor Unit, which guarantees the liquid entrainment loss to be less than 1/10 gallon per million standard cubic feet of flowing gas.

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REPRESENTATIVES IN ALL PRINCIPAL CITIES

47 miles, 20-in., planned, Benton Township, Hocking County, to Columbus, Ohio.

61 miles, planned, northern and southwestern Ohio.

33 miles, 20-in., proposed, Jefferson to Seneca, Ohio.

69 miles, 20-24-in., proposed, lines to tiein Gulf Interstate line along various points in Lawrence, Jackson, Vinton, Hocking and Fairfield counties, Ohio.

Pacific Gas & Electric Co.—200 miles, 34-in., under way, paralleling Topock-Milpitas line. Completion planned in 1954. Engineers Limited Pipe Line Co.

20 miles, 16-in., completed, Burrell to Easton, Calif. Alex Robertson Co.

8 miles, 16-in., completed, Shellville to Old Adobe, Calif. M. G. M. Const. Co.

15 miles, 20-in., under way, Helm Junction to Helm Tap, Calif. Alex Robertson Co.

M-SCOPE PIPE FINDER

MODEL AB

ONE MAN OPERATION

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IMMEDIATE DELIVERY

ONLY **$149.50**

FISHER RESEARCH LAB., Inc.
PALO ALTO CALIF.

15 miles, 12-in., under way, Herndon to Madera, Calif. Company forces.

13 miles, 16-in., to be completed in 1954 from Fairfield to Napa Wye, Calif. M. G. M. Const. Co.

• **Pacific Northwest Pipeline Corp.**—1,466 miles, proposed, Ignacio, Colo., to Bellingham, Wash.

380 miles, proposed, laterals and spurs off main line to Pocatello, Idaho, to Yakima, Wash.

Permian Basin Pipeline Co.—280 miles, 16-24-26-30-in., under way, West Texas and New Mexico. R. H. Fulton & Co.

• **Rockland Light & Power Co.**—22 miles, 8-in., proposed, Orangetown to Tompkins Cove, N. Y.

• **Shenandoah Gas Co.**—39 miles, 3-4-8-in., proposed, Middleton, Va., to Martinsburg, W. Va.

• **South Georgia Natural Gas Co.**—339 miles, 2-12-in., planned, Phoenix, Ala., to Tallahassee, Fla. (a) 12-in., Phoenix, Ala., to Albany, Ga., (b) 10-in., Albany, Ga., to Moultrie, Ga., (c) 8-in., Moultrie, Ga., to Tallahassee.

• **Southeast Alabama Gas District.**—150 miles, 10 and 8-in., planned, Phoenix City to Dothan, Ala. Engineering Const. Co.

Southern California Gas Co., and Southern Counties Gas Co.—73 miles, 30-in., under way, loops on main line from Blythe to Los Angeles. River Const. Co. 1-54.

Southern Natural Gas Co.—1,235 miles, 24 to 4½-in., under way, Louisiana, Mississippi, Albama, and Georgia, and South Carolina. Houston Contracting, Latex and H. C. Price. Fall 1953.

Gwinville to Pickens. Completion in 1954.

Gwinville, Miss., to Ellerslie, Ga. Completion in 1954.

• **Southwest Gas Corp., Ltd.**—26 miles, proposed, from P.G.&E. line to Victorville, Calif.

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A Better Strainer! —by DAVIS

— with BOLTED CAP

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If you think all strainers are alike, ASK THE MAN WHO HAS TO GET INTO THEM! Davis builds strainers with bolted caps (instead of threaded caps) because numerous engineers have asked for them. It's easier to remove bolts than to try to unscrew a large thread cap after a strainer has been in use. Also makes possible locating blow-off at lowest point; no sediment pocket. Don't confuse Davis precision-made strainers with ordinary pipe fittings. Available in wide choice of types for steam, air, gas, or fluids. Semi-steel, bronze, or steel bodies; screwed or flanged. Pressures to 1500 p.s.i. Brass, stainless or monel strainer screen. Ask for bulletin 100-A.

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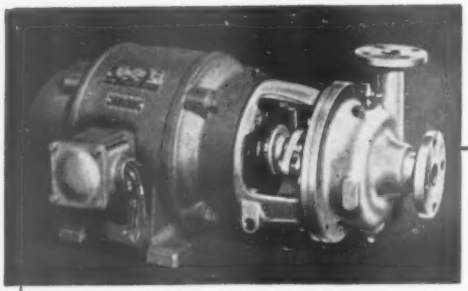

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AMPCO* Centrifugal Pumps

Take the headache out of pumping acids — use Ampco Centrifugal Pumps. Made of Ampco aluminum bronzes, they have exceptional resistance to corrosion. And they also resist the damaging effects of cavitational erosion, deformation, and wear.

That's why Ampco Pumps are ideal for handling difficult liquids such as hot sulfuric acid, hot acetic acid, hydrofluoric acid, fatty acids — as well as dyestuffs, caustics, brine, and other corrosive liquids.

Best of all, Ampco Pumps *sell at standard pump prices* — even with all their extra advantages. They're available in sizes from fractional flow to 600 gpm — with close-coupled or pedestal mounting. Write for more information today.

AMPCO

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West Coast Plant: Burbank, California

Reg. U. S. Pat. Off. P-6

• **Tennessee Gas Transmission Co.**—571 miles, 30-in., planned, Kinder, La., to Portland, Tenn.

67 miles, 30-in., planned, loops in Texas and Louisiana.

63 miles, 26-in., planned, loops in Ohio and Pennsylvania.

58 miles, 20-in., planned, Louisiana Gulf Coast to Station No. 507 near Kinder, La.

100 miles, laterals in Texas.

45 miles, 20-in., proposed, Buffalo, N. Y., to the U.S.-Canadian border near St. Catherines.

243 miles 24-in., planned, Coudersport, Pa., eastward across Pennsylvania, New Jersey, and New York to point near Greenwich, Conn.

• **Texas Eastern Penn-Jersey Transmission Corp.**—265 miles 24-in., planned, from Oakford Storage field in western Pennsylvania to Texas Eastern Transmission Corp.'s Compressor Station No. 26 near Lambertville, N. J.

• **Texas Gas Transmission Corp.**—48 miles, 26-in., planned, loops from Memphis to Slaughters, Ky.

• **Texas-Ohio Gas Co.**—1,435 miles, 30-in., proposed, Hidalgo County, Texas, through Arkansas, Mississippi, Tennessee, and Kentucky on to Spencer, W. Va.

• **Transcontinental Gas Pipe Line Corp.**—533 miles, 30-36-in., looping along Texas-New York line.

• **Trans-Northwest Gas, Inc.**—246 miles, proposed, International Boundary near Osoyoos, B. C., to Washington and Idaho.

275 miles, branch lines.

United Gas Fuel Co., and Central Kentucky Natural Gas Co.—57 miles contracted, to Putnam County, West Virginia. H. C. Price Co.

• **United Fuel Gas Co.**—52 miles, 20-24-in., proposed, Wood County to Lanham, W. Va. Spring 1954.

57 miles, 30-in., proposed, Lanham in Kanawha County, West Virginia, to Gulf Interstate line in Boyd County, Kentucky. Spring '54.

United Gas Pipe Line Co.—44 miles, 20-in., under way, Lirette field to Harvey, La. Brown & Root.

• **United Natural Gas Co.**—50 miles, 12-in., planned, Elk County to Jefferson County, Pennsylvania.

• **Utah Natural Gas Co.**—103 miles, 16-18-in., proposed, Clear Creek field near Price to Salt Lake City, Utah.

18-in., Clear Creek to Provo, Utah.

16-in., Provo to Salt Lake City, Utah.

Virginia Natural Gas Co.—153 miles, Buckingham to Richmond and Portsmouth, Va.

Warren Petroleum Co.—54 miles, 4-30-in., homa. Completion date 6-54.

25 miles, 3 to 20-in., Garvin County, Oklaplanned, Lea County, New Mexico.

Westcoast Transmission Co., Ltd. — (See foreign natural gas pipe lines).

Foreign Crude-Oil Pipe Lines

• **Arabian American Oil Co.**—18 miles, 22-20-in., planned, Qatif to Ras Tanura No. 3. Completion date 1-55.

Bombay Port Trust.—50 miles, 8 to 24-in., contracted, Bombay, India, to serve Standard Vacuum Oil Co., and Burmah Shell refineries. Merritt, Chapman & Scott Corp., contractors. (Crude and Products.)

• **Creole Petroleum Corp.**—25 miles, 34-in., planned. Lagunillas to La Salina (State of Zulia, Venezuela.) Completion date 9-54.

Direccion General de Yacimientos Petroliferos Fiscales—409 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

• **Gaz de France**—200 miles, 12-in. Ruhr to Paris, France.

• **Interprovincial Pipe Line Co.**—600 miles 24 and 26-in. loops, planned, along Interprovincial system between Edmonton, Alta., and Superior, Wis.

Try a HELICOID. Find the toughest spot you have for a gage. Let the HELICOID prove itself. Let it show you how much these quality gages can save you, especially in maintenance, as the standard gage throughout your plant.

HELICOID has no gears to wear out!

Flutter, extreme surges, rapid pulsations—these break down ordinary gages but they can't hurt a HELICOID because 1) the HELICOID has no gears, no teeth to wear out; 2) the cam releases from roller at maximum dial graduation (it resets automatically, instantly). See illustration below.

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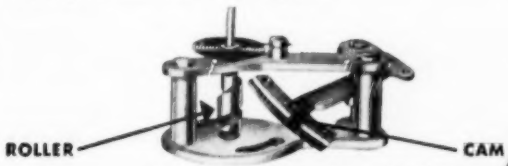
You can get HELICOID Gages for pressure, vacuum, or compound service—in all pressure ranges; white, black or radiant faces; wall, stem, flush, and panel mountings, for flangeless cases. See your distributor today or write for **catalog G-2.**



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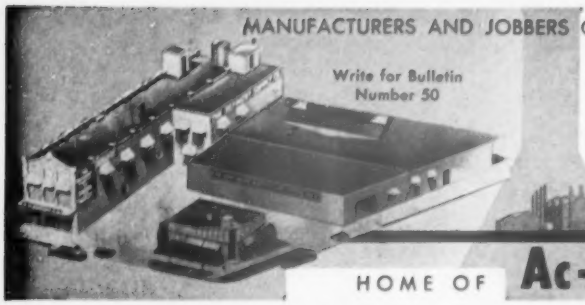

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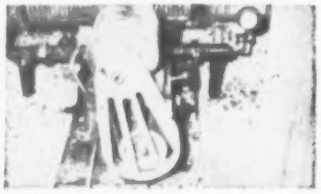

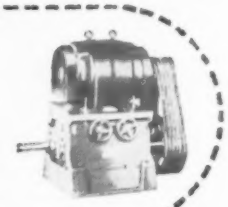

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- **4-speed selection**
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- **Turner transmissions are NOT expensive. They pay for themselves in a short time.**

Use smaller, inexpensive electric motors—select the pumping speed to meet your needs. Correct cold weather problems by eliminating "oil cutting". Power bill savings soon equal cost of installation.

Write for Catalog, or See Your Local Oil Field Equipment Dealer.

TURNER UNI-DRIVE Company
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• **Petroleos Mexicanos.**—145 miles, 12-in., considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

100 miles, planned, Ishthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

72 miles, 12-in., proposed, Poza Rica to Atzacapotzalco, Mexico.

Petroleos Mexicanos.—125 miles, 10-in., under way, Jose Colomo to El Plan, Mexico.

• **Saskatoon Pipe Line, Ltd.**—56 miles, 6-in., planned, Milden to Saskatoon, Sask.

Texas Petroleum Co. — 60 miles, 4-6-in., under way. Pta. Nino de La Dorada.

• **Trans Mountain Oil Pipe Line Co.**—30 miles, planned, Vancouver, B. C., terminal to Ferndale, Wash.

• **Yacimientos Petroliferos Fiscales Bolivianos.**—170 miles, 4-in., planned, Bermejo to Tupiza, Bolivia.

Foreign Products Pipe Lines

Anglo-Iranian Oil Co., Ltd.—18½ miles, 16-in., under way, Little Aden to Aden. Bechtel Corp. Completion date December 1954.

18½ miles, 6-in., under way, Little Aden to Aden. Bechtel Corp. Completion date December 1954.

15 miles, 12-in., under way, Kwinana to Fremantle, M. W. Kellogg Co. Completion date February 1955.

17 miles, 6-in., Kwinana to Fremantle. M. W. Kellogg Co. Completion date February 1955.

Columbian Ministry of Petroleum — 115 miles, 4-in., under way, La Dorado to Cartago, Colombia. William Bros. Engineers. Completed.

93 miles, 8-in., under way, Cantimplora to Dorado, Colombia. William Bros. Constructors. Completed.

• **Empresa Nacional del Petroleo** — 80 miles, 6⅝-in., planned, Concon to Santiago, Chile.

• **Governments of Southern Rhodesia and Portuguese East Africa.**—200 miles, considered, Beria, Portuguese Mozambique to Umtalia, Southern Rhodesia.

North Atlantic Treaty Organization (NATO)—1,920 miles, 4-10-in., to serve military bases in Western Europe (to connect with U. S. Government's St. Nazaire-Paris-Metz line.) Contracted by Soc. Foster Wheeler Francaise.

• **Petroleos Mexicanos.**—124 miles, 6-in., planned, Lagos to Guadalajara, Mexico.

54 miles, 6-in., planned, Lagos to Aguascalientes, Mexico.

82 miles, 8-in., planned, Salamanca to Lagos, Mexico.

• **United States Government.**—375 miles, 12-in., planned, St. Nazaire to Melun and Metz, France.

Foreign Natural-Gas Pipe Lines

Azienda Generale Italiana Petroli — 90 miles, 12-in., under way, Cortemaggiore to Bologna, Italy, SNAM crews.

120 miles, 16-in., under way, Cremona Porto Mar to Ghera, Italy, Montubi, contractor.

40 miles, 12-in., under way, Ripalta-Bergamo, Italy.

Direccion General del Gas del Estado—310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

• **Empresa Nacional del Petroleo** — 80 miles, 10-in., planned, Concon to Santiago, Chile.

• **Mid-Continent Pipelines, Ltd.** — 1,860 miles, 30-in., proposed, Alberta to Montreal, Canada. Fish Engineering Co.

• **Northwest Natural Gas Co.**—950 miles, 24-in., planned, Alberta fields to Vancouver, B. C., Seattle, Wash., and Portland, Ore.

Petroleos Mexicanos. — 205 miles, 16-in., under way, Monterrey to Torreon, Mexico.

• **Petroleos Mexicanos.**—440 miles, 20-in., planned, Brazil to Tampico to Poza Rica, Mexico.

BEST ALL-AROUND PLAIN END PIPE COUPLING ON THE MARKET!

HERE'S WHY... *The Roust-A-Bout grips (teeth) take a strong, positive, circumferential bite on the pipe—as does a Tubing or Pipe Slip. The curved grips assure maximum gripping area for greatest holding power. This is the exclusive Roust-A-Bout, bull dog grip.*

Why accept less than the best when you are using plain end pipe couplings? Victaulic Roust-A-Bouts are specially engineered to provide the most reliable pipe connections you can use. With inclined, curved grips they bite into pipe circumference—provide a far stronger and surer hold.

Roust-A-Bout Couplings are just what the name implies—reliable, sturdy, adaptable and ingenious—ready for those tough field jobs where only plain end pipe is used or where the simple Victaulic Groove Method is not quickly available.

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- You *cut* and *couple* your pipe as you go!
- You can use *plain* or *beveled end* pipe!
- You can use *new* or *used* pipe!
- For use on *permanent* piping or *repair* work!
- You need only one tool—a *socket wrench!*
- Roust-A-Bouts are simple and factory finished!

For your next job—insist on the best—Victaulic Roust-A-Bouts. They're available at all Victaulic Stocking Supply Houses in pipe sizes—2", 2½", 3", 3½", 4", 5", 6", and 8".

Write today for the Victaulic Roust-A-Bout Catalog No. 44-8F.

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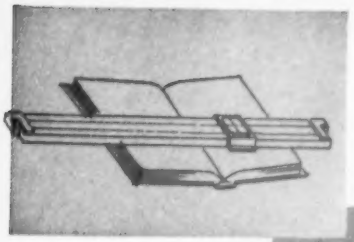

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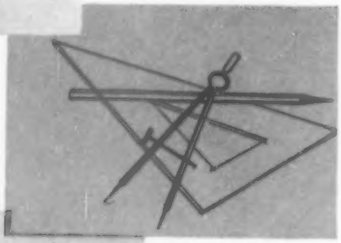

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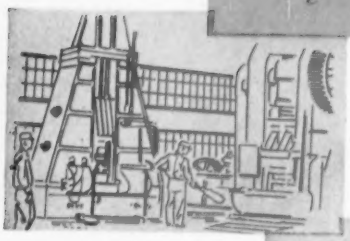
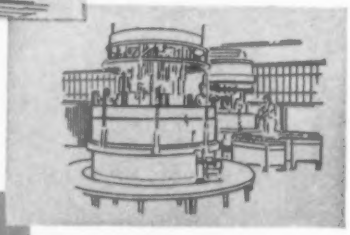
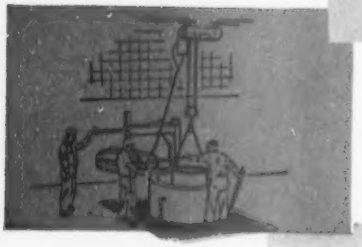


through forging the parts

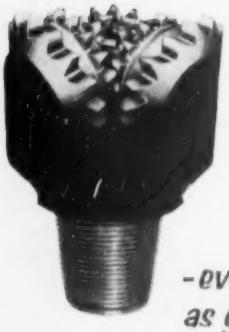


and machining the legs



to heat treating for strength

and hard-facing cutter teeth



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Among the Drilling Contractors

Six More Men Added to Loffland 25-Year Group

Six more members of Loffland Brothers Co.'s organization were added the past year to the list of those who have had 25 years or more of continuous service with the company. They swell the list to 17.

The six additions include: J. O. Rundle, vice president, Maracaibo, Venezuela; George C. Mallory, general superintendent, Lafayette, La.; O. H. Poe, assistant superintendent, New Iberia, La.; Charles Brown and Clyde Long, tool pushers, Oklahoma City; and Leroy Patton, truck pusher, Casper, Wyo.

The service record of the oldest employe still associated with the company dates from 1921. The company was founded in 1918 and operated with cable tools until 1924, when its first rotary rig was acquired.

Chance Drilling Co., Beaumont, Tex., has a contract with Reynolds Mining Corp. for deepening a formerly abandoned wildcat the operator has taken over in Brazoria County, Texas Gulf Coast. The test, 1 Burrows, 6 miles northwest of Alvin, was drilled by Texas Crude Oil Co. and abandoned earlier this year at a total depth of 9,500 ft. It is expected to be deepened to approximately 11,000 ft.

J & C Drilling Co. has contracted with Southern Minerals Corp. for a 7,200-ft. wildcat test to be drilled southwest of Violet, in Nueces County, lower Texas Gulf Coast. Location is for 1 Blossman-Bernsen unit, in Block 11, Cushing-Petrus Subdivision. It is 2¾ miles southeast of Robstown field.

O. W. Killam, Laredo, Tex., is contractor on a projected 3,700-ft. wildcat test F. William Carr is starting at 1 Benavides, 4 miles north of Bruni and 2 miles southeast of West Cole field, in eastern Webb County, Southwest Texas. Location is a mile west of the Duval county line.

Nicklos Drilling Co., Houston, which drilled Amerada Petroleum Corp.'s recently completed first oil producer in Bayou Fordoche field, Pointe Coupee Parish, southern Louisiana, has moved its rig to another location on the same lease for Amerada's second well, 2 Sundean, projected to 10,600 ft.

Zach Brooks Drilling Co., El Dorado, Ark., has a new 8,500-ft. operation under way at a wildcat location east of Wesson, in Union County, southern Arkansas. Contract is for Austral Oil

Earl White (top left), tool pusher, and W. F. Grinstead, (top right), driller, with three members of their drilling crew, Lonnie Dailey, H. L. Nerren, and M. B. Ratcliff (bottom row, left to right), on a rig Hinkle Drilling Co., of Houston, is operating for Sun Oil Co. in the Caplan area, on Bolivar Peninsula, Galveston County, Texas Gulf Coast. (Photograph by courtesy of Mission Manufacturing Co., Houston.)

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MOVE Rigs and set 'em up FASTER with SIMPLEX SCREW JACKS

Many drillers are saving time by permanently attaching Simplex Screw Jacks to the underside of their rig floor. When the rig is to be moved, turnbuckle bracing is unfastened and jack is swung up, out of way. At new location, jack is swung down, turnbuckles attached and jack is ready to level rig. Jack can't get lost, is always available for use.

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LONG LOK-ON CENTRALIZERS (FIG. 905)

The double-bow design of these advanced Casing Centralizers provides more than sufficient strength to center any string of casing under any condition which casing might be run.

Range "A"

Range "B"

Range "C"

Range "C"

Range "B"

Range "A"

SHORT LOK-ON CENTRALIZERS (FIG. 904)

Economical, easy-to-install, easy-to-run Casing Centralizers which are second only to the Larkin Long Lok-on in centering strength and efficiency. They are fully satisfactory for use under any but the most extreme conditions.

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Pike Veteran Supervises Drilling Deviated Wells

When Thomas P. Pike Drilling Co., of Los Angeles, took on the job of drilling a series of directional wells for Standard Oil Co. of California at Montalvo beach, near Oxnard, Calif., it placed W. E. Sauder, veteran tool pusher for the company, in charge of operations.

W. E. SAUDER

Sauder not only is a veteran with this leading Pacific Coast contracting company, but has worked continuously in California oil fields for various companies for 36 years. He got his first oil field job in 1917 when he was 22 years old. Within 3 years he had worked up to become a driller. He joined Pike as a driller in 1939, shortly after this company was organized.

At Montalvo, he has supervised the drilling of three directional wells so far. The wells, located on the beach, have been drilled to bottom locations under the Pacific Ocean, calling for horizontal deviations of more than 1,000 ft. with total depths of approximately 12,500 ft.

Sauder was born in Canada in 1895, but came to California in 1900 with his parents, who settled on a ranch, on which he lived until he decided in his early twenties that the oil business was more to his liking.

ACTIVE ROTARY RIGS*

Area—	Week ended 1-18-54	Change week ended 1-11-54	Change week ended 1-19-53
Gulf Coast	532	−20	−76
N. & W. Tex.-N. M.	771	+39	− 6
Ark.-N. La.-E. Tex.	161	− 6	+22
Oklahoma	345	−12	+16
Kansas-S. Nebraska	145	+10	− 6
Illinois-Eastern	118	− 8	+29
Rocky Mountains	261	−11	+46
Pacific Coast	166	0	−13
Total U. S.	2,499	− 8	+12
Western Canada	152	− 1	−13
Total	2,651	− 9	− 1

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States, Rocky Mountains, and Western Canada are shown on pages 448 and 449.

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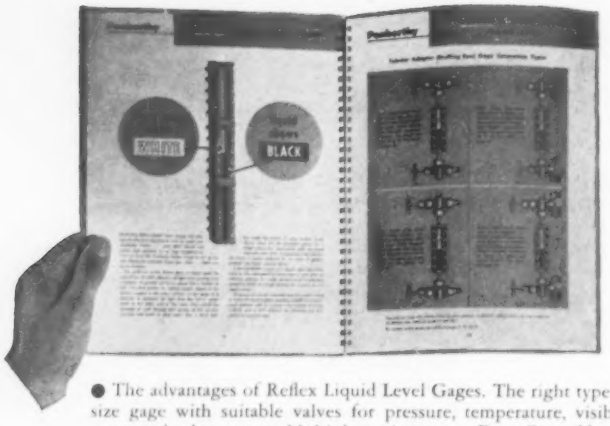
FACTS AT YOUR FINGERTIPS



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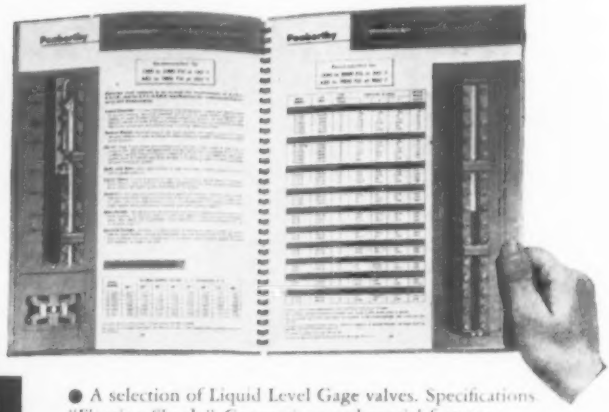
● When to use Transparent Liquid Level Gage Sets. High pressure steam service. Adapters, valves, connections. Types available with recommendations.



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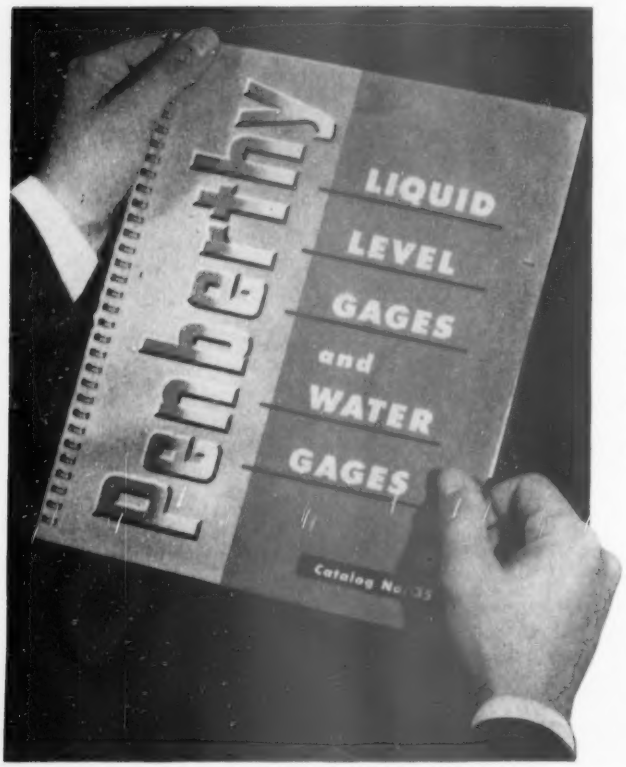

Penberthy's Catalog 35 is jam-packed with illustrated facts and specifications. It is your best guide to selecting the right liquid level gage sets at the most economical cost. In the complete Penberthy line, there are standard products for almost every application. Where your needs are special or unique, use the experience of almost 70 years to solve them. Take a tip from many thousands of satisfied users and write for your copy of Catalog 35.

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REFINING

Three Electrolytic Caustic Regeneration Units Operating

NEW YORK.—American Development Corp. announced that three new electrolytic caustic regeneration units have been placed in operation in refineries in three countries.

Refineries with these new installations include those of Sun Oil Co., Ltd., at Sarnia, Ont., Canada; Leonard Refineries, Inc., at Alma, Mich.; and Raffineries Francaises de Petrole de L'Atlantique at Donges, France.

Caustic is regenerated following its use in the treatment of straightrun, catalytically cracked and thermally cracked gasoline fractions. The initial unit of this type was installed at the Catlettsburg, Ky., refinery of Ashland Oil & Refining Co.

Third Quarter Refining Profits Up From 1952

WASHINGTON.—Profits of petroleum refining corporations in the third quarter of 1953 were 16 per cent ahead of those in the same 1952 period before taxes, and 17 per cent greater after taxes.

A joint survey by the Securities and Exchange Commission and Federal Trade Commission placed refinery profits before taxes at $751,000,000 compared with $649,000,000 in 1952. Profits after taxes were figured at $751,000,000, compared with $465,000,000 in 1952.

The increase in profits before taxes was slightly below the average of 17 per cent calculated for all corporations, but the after-tax profits were substantially above the all-corporate increase of 11 per cent, the commissions noted.

New Electrical Control System For Precipitators Is Revealed

NEW YORK.—A new system of automatic voltage control for precipitators was revealed here at the winter general meeting of the American Institute of Electrical Engineers.

The system is particularly applicable to the Cottrell process of electrically removing suspended matter from gases, which is used in connection with catalytic crackers in oil refining.

H. J. Hall of Research Corp., Bound Brook, N. J., said, "The equipment may be applied both to new rectifier sets and as an adjunct to existing rectifier sets."

Col-Tex Operating New Platformer at Colorado City

COLORADO CITY, Tex.—A new 1,500-bbl. per day Platformer was recently put on stream by Col-Tex Refining Co. at its refinery here.

The new unit is processing gasoline made from West Texas and North Snyder crudes to produce platformate with a leaded octane ranging from 93 to 96 for use as a blending component for motor fuels.

Republic Oil Refining Co. Puts New Platformer on Stream

TEXAS CITY, Tex.—Republic Oil Refining Co. placed a 5,500-bbl. per stream day Platforming unit at its refinery here recently.

Platformate produced will be used as a blending component to increase the octane rating of Republic's gasoline.

Union Oil Takes Land Option

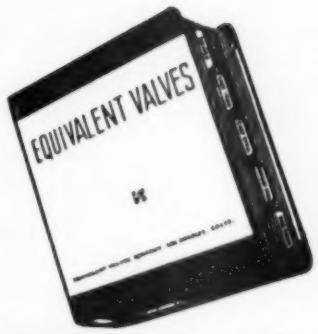
LOS ANGELES.—A 5-year option to purchase 700 acres of land for possible future expansion of the Oleum refinery in Contra Costa County, California, has been taken by Union Oil Co. of California.

Refinery manager John Towler said, "Completion of Oleum's portion of new units in Union's $40,000,000 refinery expansion program will largely use up the refinery's present available acreage."

Refining Briefs

BATON ROUGE. — Esso Standard Oil Co. has started construction on a 192 by 216-ft. air-conditioned warehouse at its 312,000-bbl. refinery here. Walter Kidde Constructors, Inc., which is handling the construction, expects to complete the project in April.

CLEVELAND. — An addendum to the contract for additional tankage and transfer facilities at the Standard Oil Co. (Ohio) refinery at Lima, Ohio, has been awarded to Arthur G. McKee & Co. here. This new award is for $51,100 to cover the design, purchasing,



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and construction in connection with the revamping of the refinery's water-treating plant.

Petrochemicals

Brea's New Ammonia Plant Nearing Completion

LOS ANGELES. — Brea Chemicals, Inc., subsidiary of Union Oil Co., will start operation about March 1 of its new $13,000,000, 150-ton aqueous ammonia plant at Brea, Calif.

A portion of the plant's output will go to Hawaiian plantations. At Honolulu, Union has completed construction of a 25,000-bbl. tank, cargo pipe line, and loading rack for handling aqueous ammonia. These, as well as similar facilities being erected at Hilo, will be leased to Brea Chemicals.

To serve the agricultural market in California's central valley area, a 35,000-bbl. tank is planned for Stockton.

Anhydrous Ammonia Output By Phillips Nearly Doubled

BARTLESVILLE, Okla.—The start of operations at a new 450-ton per day plant at Adams Terminal on the Houston, Tex., ship channel by Phillips Chemical Co. has practically doubled the production of anhydrous ammonia by Phillips Petroleum Co., according to K. S. Adams, chairman, and Paul Endacott, president.

A new 45-ton per day triple superphosphate fertilizer plant at Adams Terminal and completion of additions at the Dumas, Tex., plant have more than doubled the production of nitric acid used in the manufacture of ammonium nitrate, they said.

The new plants at Adams Terminal will take 26,000 M.c.f. per day of natural gas from Phillips reserves in the nearby Chocolate Bayou field.

Alcohol Output Contracted

TUSCOLA, Ill. — Commercial Solvents Corp. has contracted on a long-term basis for a substantial portion of the synthetic ethyl alcohol production of the new $50,000,000 plant of National Petro-Chemicals Corp. here.

The new plant, owned jointly by National Distillers Products Corp. and Panhandle Eastern Pipe Line Co., has a daily producing capacity of 125,000 gal. of 192 proof alcohol, which represents about 20 per cent of the national output capacity for this important synthetic *(The Oil and Gas Journal, November 23, page 48).*

A major oil refining company on the eastern seaboard is building a catalytic reforming plant with capacity of 17,600 barrels per day....

... and PETROCHEM-ISOFLOW Furnaces will charge this 17,600 bpd plant.

A major oil refining company on the Texas gulf coast is building a catalytic reforming plant with capacity of 21,000 barrels per day....

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More than 1150 Petrochem-Isoflow Furnaces are in operation throughout the world in the petroleum, chemical and allied industries ... for all processes and for any duty, pressure, temperature and efficiency ... and all

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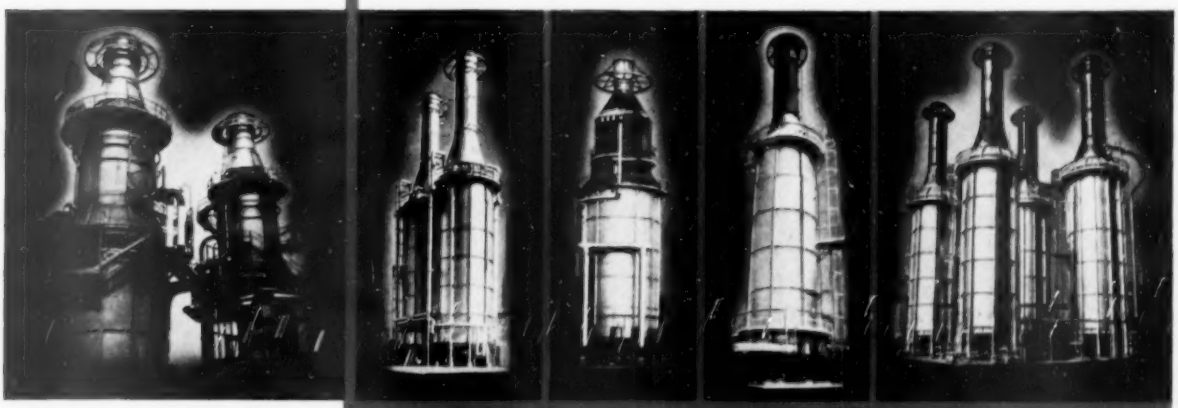

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PIPE LINES

Tanker Threat Is Seen

Sun Pipe Line president warns proposed construction of "super inch" defense line would destroy flag fleet

PHILADELPHIA, Pa.—A threat to the American flag tanker fleet was cited last week by the president of Sun Pipe Line Co. in the proposed construction of a "super inch" pipe line from the Southwest to the eastern seaboard.

William C. Kinsolving, speaking before the Philadelphia section of the Society of Naval Architects and Marine Engineers, warned that construction of the line as a defense measure at the present time might destroy the tanker fleet.

He said tankers could not compete on a cost basis with a pipe line capable of moving a million barrels of oil a day. Pointing to the trend toward larger and larger diameter lines, using a hypothetical case, he said that if the diameter was large enough, a pipe line could haul at a lower cost per ton-mile than could tankers.

Cites competition . . . "For such large quantities," Kinsolving said, "the cost of operation would be exceedingly low—so low that our present tanker fleet could not compete with it and we might be placed in the position of having automatically destroyed our American flag tankers through competition without ever a shot having been fired.

"Certainly, we cannot fight a global war without a strong American flag tanker fleet."

Kinsolving said that while building the proposed line is a sound movement from a strictly defense standpoint, if such a line were laid at present and made available for use, there would be a great tendency to use it.

The Petroleum Administration for Defense in Washington, at the request of the National Security Council and the Office of Defense Mobilization, has scheduled conferences to discuss the feasibility of building such a pipe line.

Alternative . . . Kinsolving proposed as an alternative to make ready as much material as possible and complete engineering work on the proposed line. Then the line could be built in a hurry when—and if—war begins.

However, he agreed that in an atomic war, the war might begin and end within a matter of weeks "so there is much to be thought of in connection with the plans."

Comparing pipe lines and tankers, he said that in many cases tanker operating is cheaper. The ships have greater flexibility in destinations, greater selectivity in cargo, and can operate at high efficiency while handling smaller amounts of cargo.

Ask Line Merger

Tennessee Gas applies for merger of subsidiary firm

HOUSTON, Tex.—A merger of its wholly owned subsidiary, Northeastern Gas Transmission Co., has been requested by Tennessee Gas Transmission Co. in an application filed with the Federal Power Commission.

The merger would be accomplished by cancellation of Northeastern's $9,000,000 in capital stock, all owned by Tennessee Gas, and cancellation of $8,915,700 in Northeastern demand notes held by Tennessee Gas.

Tennessee Gas would assume the bonded debt and other outstanding obligations of Northeastern, and would transfer the gas plant, depreciation, and other accounts to its books.

With a 533-mile pipe-line system, Northeastern services distributors in Massachusetts, Connecticut, New Hampshire, and Rhode Island, and is authorized to do business in Maine and Vermont.

Permits asked . . . In another application with the FPC, Tennessee Gas has asked permission to construct about 243 miles of pipe line from a compressor station in the Hebron storage field in Potter County, Pennsylvania, to a connection with the Northeastern system near Greenwich, Conn. *(The Oil and Gas Journal, December 21, page 341.)*

Tennessee Gas has also filed application, jointly with Iroquois Gas Corp., for the development of the Colden storage field in Erie County, New York, with an estimated capacity of 10,000,000 M.c.f. of natural gas. The pro-

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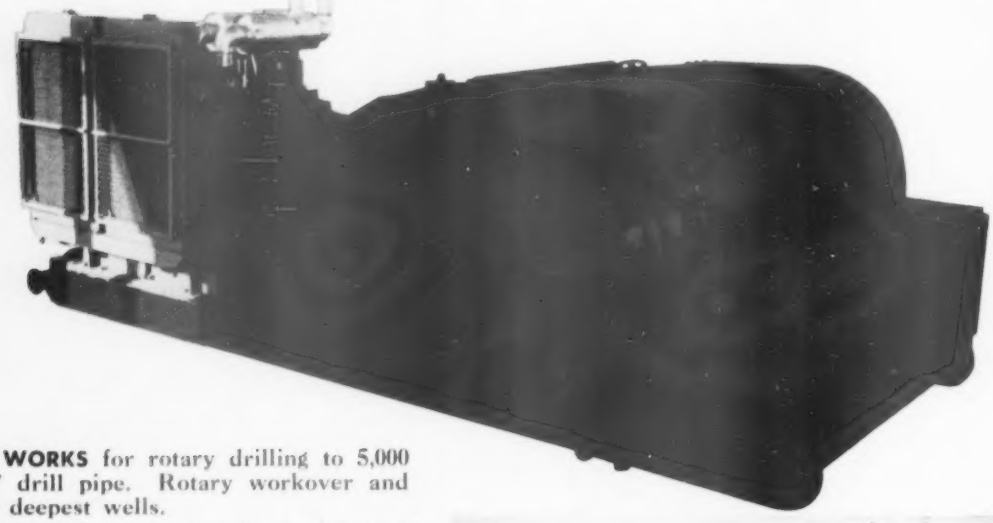
COOPER D-40 AND D-50
DRAW WORKS AND TRAILER RIGS



D-50 DRAW WORKS for rotary drilling to 5,000 ft. with 4½″ drill pipe. Rotary workover and servicing the deepest wells.

Brakes: 52″ dia. x 10″ face to handle the heaviest loads safely.

Powered by diesel or gas engine up to 400 horsepower.

D-40 DRAW WORKS for rotary drilling to 4,500 ft. with 4½″ drill pipe. Servicing and rotary workover to 10,000 feet.

Brakes: 42″ dia. x 8″ face.

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These modern rigs are similar in design. *Both* have—

Torque Converter drives,

Oil Bath multiple strand roller chain drive to countershaft,

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posed storage project would cost Iroquois an estimated $2,672,000 and Tennessee Gas an estimated $7,982,-974.

Another joint application has been filed along with New York State Natural Gas Corp. for the development of a full top storage capacity of 19,-680,000 M.c.f. in the Harrison field in Potter County, Pennsylvania, and Steuben County, New York. New York Natural's share of the estimated cost would be $5,875,726 and Tennessee Gas' share would be $6,844,997.

Texas-Illinois Sells Bonds To Finance Line Expansion

NEW YORK.—First mortgage bonds amounting to $15,500,000 have been sold by Texas-Illinois Natural Gas Pipeline Co. to help finance an expansion program scheduled for completion this month *(The Oil and Gas Journal, January 4, page 112)*.

Also last week in Washington, the Federal Power Commission made effective January a suspended $5,857,-600 annual wholesale natural gas rate increase. The rate increase is subject to the posting of a $585,000 bond and the refund of any amounts subsequently disallowed by the FPC.

Pipe Ordered for Extension

VANCOUVER, B. C. — Pipe has been ordered to extend Trans Mountain Oil Pipe Line Co.'s pipe line from here to Ferndale, Wash., according to J. Grant Spratt, president.

Spratt said all right-of-way agreements have been obtained for extension of the line to General Petroleum Corp.'s refinery under construction at Ferndale. The refinery will take 35,000 bbl. daily when completed.

He said the next development will be further extension of a 20-in. line to Burlington, Wash., and a 16-in. line to Marsh Point on Anacortes Island, where Shell Oil Co. is building a refinery to take 50,000 bbl. per day.

Humble Asks Permits for Galveston Bay Pipe Lines

GALVESTON, Tex.—Humble Oil & Refining Co. has applied for permits from the U. S. Army Corps of Engineers to build two pipe lines under Galveston Bay.

The 24-in. lines, 4,700 and 1,500 ft. in length, would be laid from an existing separator platform to proposed wells in state tracts 264 and 225.

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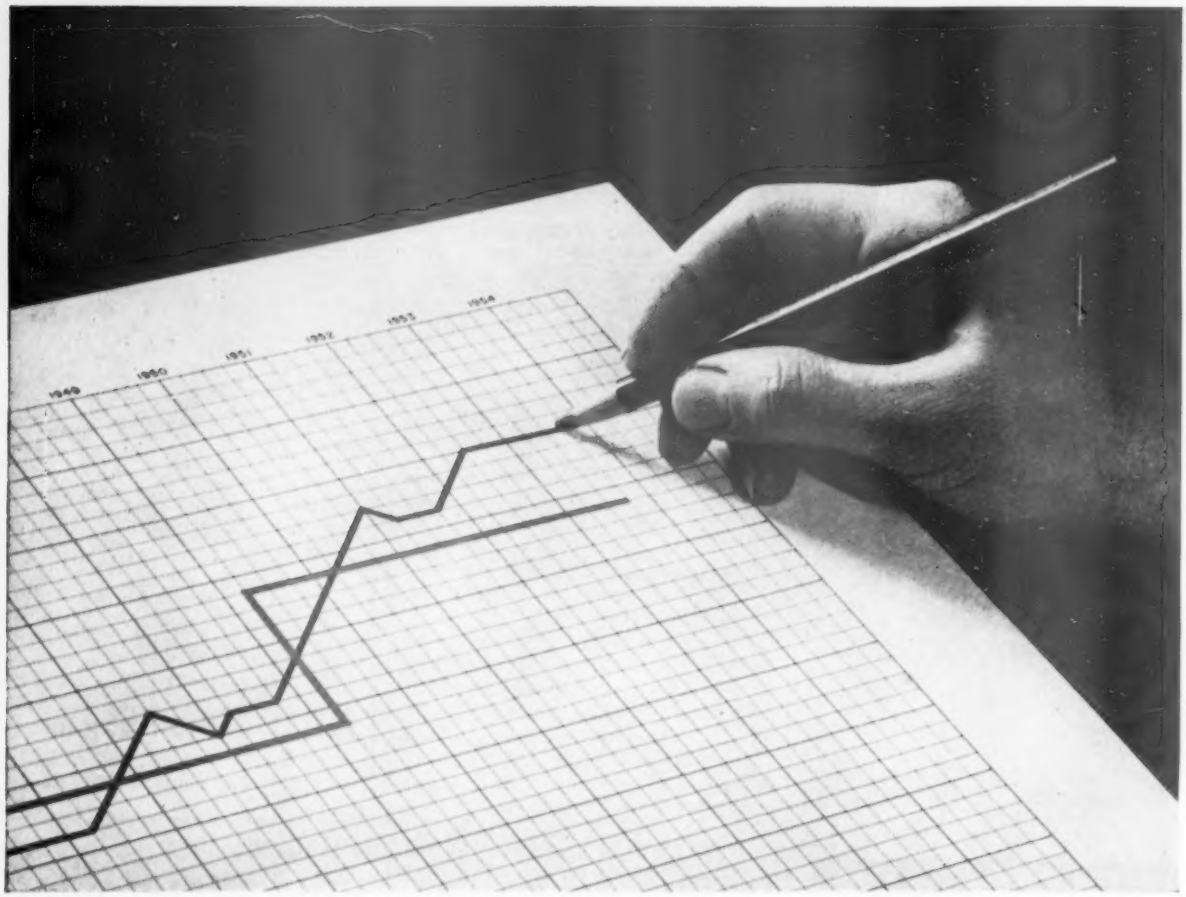

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NATURAL GAS

Minimum Well-Head Price Order Review Petitioned

KANSAS CITY.—A review of the Kansas Corporation Commission order increasing the minimum well-head price for natural gas in the Hugoton field was asked in three petitions filed in Finney County, Kansas, District Court last week.

The separate petitions were filed by Cities Service Gas Co., Kansas-Nebraska Natural Gas Co., and 48 cities in Kansas.

The suits attacked the December 2 order, effective January 1, which raised the well-head price minimum from 8 to 11 cents per M.c.f.

The petitioners claim the order was unconstitutional in that it "discriminates in favor of the Hugoton gas field against other Kansas gas fields, that the order is of a price-fixing nature and has no relation to waste and conservation of gas, that the commission has no jurisdiction or authority to issue a minimum gas price order."

The cities also attacked the establishment of a pressure base of 14.64 psi. in place of the 16.4 psi. base used prior to July 1, 1953.

Northern Natural Seeks Acquisition of Subsidiary

WASHINGTON.—Authorization to acquire all the natural-gas facilities of its wholly owned subsidiary, Independent Natural Gas Co., has been requested in an application to the Federal Power Commission by Northern Natural Gas Co.

Independent's facilities, which include an 11,200-hp. compressor station and about 21 miles of 20-in. pipe line, are located in Gray and Carson counties, Texas. Independent transports about 36,000 M.c.f. gas per day purchased from Phillips Petroleum Co. and 10,000 M.c.f. per day of gas which Northern purchases from Phillips.

Pioneer Natural Consolidated From Four Natural Gas Firms

AMARILLO, Tex.—Pioneer Natural Gas Co., a Texas corporation, has been consolidated from the former Amarillo Gas Co., West Texas Gas Co., Dalhart Gas Co., and Clayton Gas Co.

Pioneer Natural serves 60 cities and towns reaching from Clayton, N. M., on the north to Midland and Odessa, Tex., on the south, including Amarillo and Lubbock.

Amarillo Oil Co., a wholly owned producing subsidiary of Pioneer Natural, handles field gathering, field compression, and extraction and sale of natural gasoline and liquefied petroleum products. Amarillo Oil has acquired the assets of Red River Gas Co.

George Baird is president of Pioneer Natural, and A. F. Cox is president of Amarillo Oil. The companies will maintain general offices in Amarillo.

Tennessee Gas to Increase Deliveries to Three Firms

WASHINGTON. — Tennessee Gas Transmission Co. has been authorized by the Federal Power Commission to increase deliveries to three of its southern customers by a cumulative total of 19,034,000 cu. ft. of gas daily.

Those receiving the additional gas will be Alabama-Tennessee Natural Gas Co., Florence, Ala.; Tennessee Natural Gas Lines, Inc., Nashville; and Western Kentucky Gas Co., Owensboro, Ky.

Alabama-Tennessee will get 8,466,000 cu. ft. increasing its daily deliveries to 40,662,000. The additional gas will go to the company's existing customers in Alabama, Tennessee, and Mississippi. In order to carry out this project, Alabama-Tennessee has been authorized to construct 13.2 miles of 12 and 8-in. loops along with a 350-hp. compressor station in Colbert County, Alabama.

Tennessee Gas and the other two receiving increased gas will not have to expand pipe-line facilities. Tennessee Natural will get an additional 6,324,000 cu. ft., and Western Kentucky will receive 2,244,000 cu. ft. daily.

October Gas Output Down

AUSTIN, Tex.—The Texas Railroad Commission reported total gas production of 442,209,278 M.c.f. during October 1953, a decrease of 2.20 per cent from production during October 1952.

Of the amount of gas produced, a net total of 373,483,811 M.c.f. was gas available for marketing. This represents a decrease of 3.14 per cent from gas available for marketing during October 1952.

A total of 319,928,441 M.c.f. gas was produced from 9,910 gas wells, and 122,280,837 M.c.f. casinghead gas was produced from 88,255 oil wells in the state during October 1953.

Rate Schedule Suspended

WASHINGTON.—A notice of cancellation of interruptible service rate schedules filed last month by Panhandle Eastern Pipe Line Co. has been suspended by the Federal Power Commission.

Natural Gasoline

Texas Pacific to Build New Gasoline Plant Near Hamlin

FORT WORTH, Tex.—Construction of a 5,000 M.c.f. per day gasoline plant to serve the Pardue and Toler fields in northeastern Fisher County, Texas, has been announced by Texas Pacific Coal & Oil Co.

Gathering system pipe was in the ground and work was expected to have begun last week. The plant is scheduled to go into operation in the middle of April, with compressors limiting initial volume to 3,500 M.c.f. gas per day.

Yield from the initial volume will be an estimated 25,000 gal. per day of propane, liquefied petroleum gas, and natural gasoline. With the plant operating at full design capacity, yield would rise to an estimated 35,000 gal. per day. Residue gas will be marketed.

Fish Engineering Co. designed and is building the plant, to be known as the Velta plant, which is located 7 miles northwest of Hamlin, Tex., adjacent to Texas Pacific's camp in the Pardue field.

Stanolind Gets Permit For LPG Storage Cavity

AUSTIN, Tex. — Stanolind Oil & Gas Co. has received permission from the Texas Railroad Commission for a 100,000-bbl. storage cavity for liquefied petroleum gases.

The cavity, to be located near the South Fullerton gasoline plant in Andrews County, will be leached in a salt section encountered at about 1,800-2,300 ft.

Extraction Plant Planned

NEWCASTLE, Wyo. — Homer S. Head Co. of Houston, Tex., announced the purchase of 20 acres of land 35 miles southwest of here for a natural gas extraction plant.

Scheduled to be completed by midsummer, the $4,500,000 plant will take natural gas from wells in the Clareton field.

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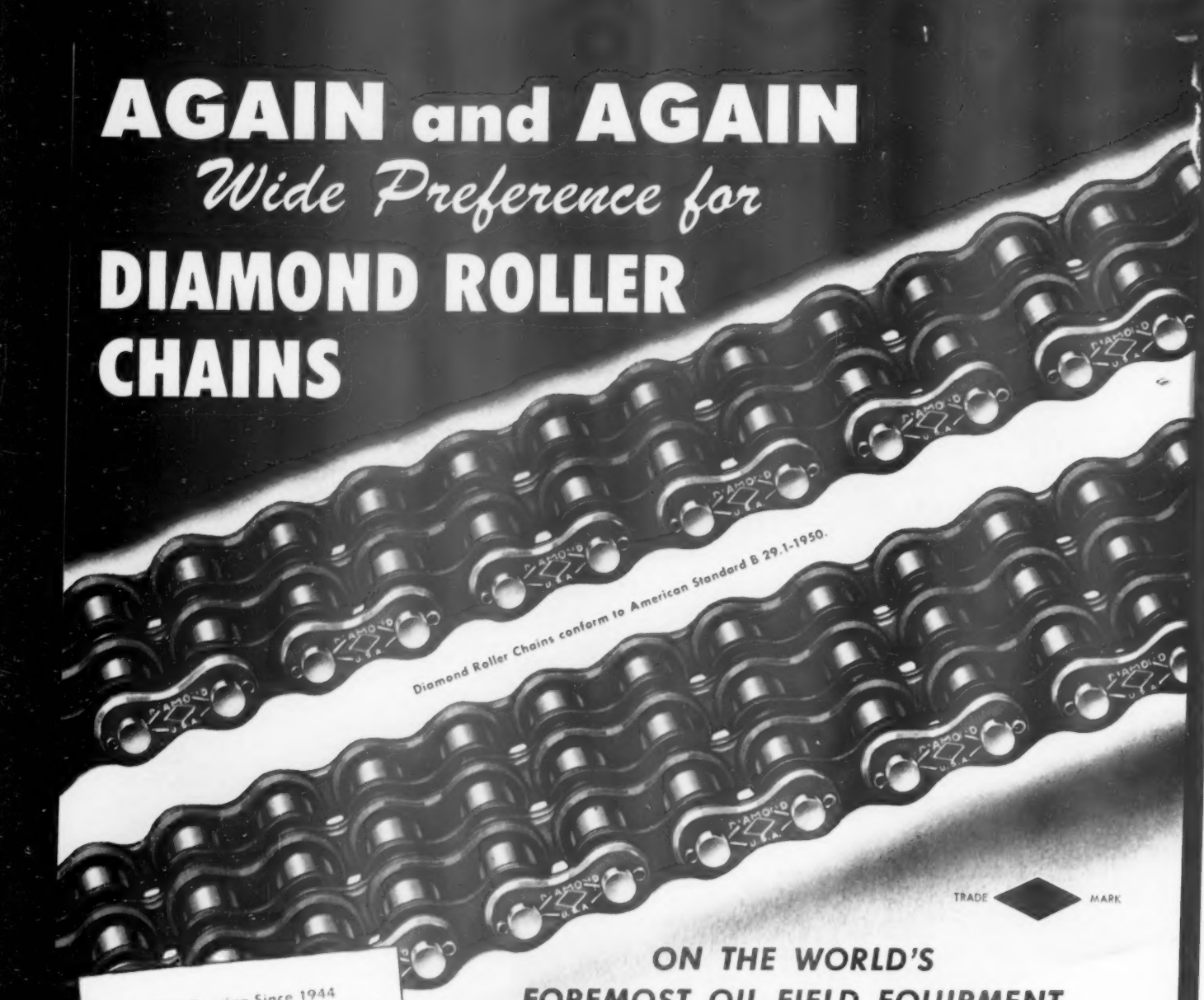

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EXPLORATION

Ventura Avenue Sets New High

Old California field still scene of exploratory drilling

by D. H. Stormont

EXPLORATORY drilling at Ventura Avenue field of coastal California continues to pay dividends although the field has been under development more than 38 years.

Like many other California fields, Ventura Avenue is comprised of several separate oil reservoirs piled one on top of the other; faulting has resulted in some zones being repeated as many as four times. Exploration thus has been along vertical lines as well as laterally along the east-west anticlinal structure.

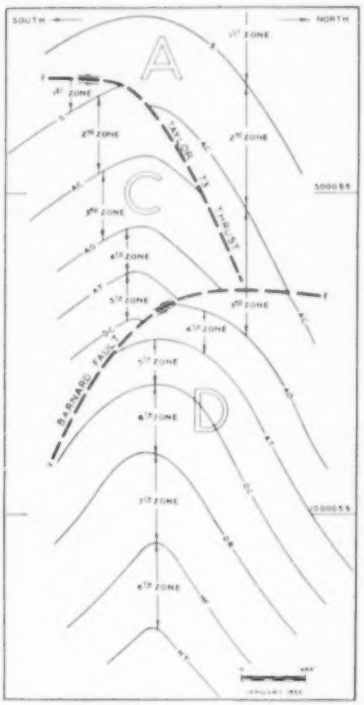
How well both searches has paid off is shown by the fact the field is producing at an all-time record high, 90,000 bbl. daily. This level is 13,000 bbl. above that being produced at this time last year. It is due principally to development of a deeper zone, the D-8, and extension of the D-5, D-6, and D-7 pays into neighboring San Miguelito.

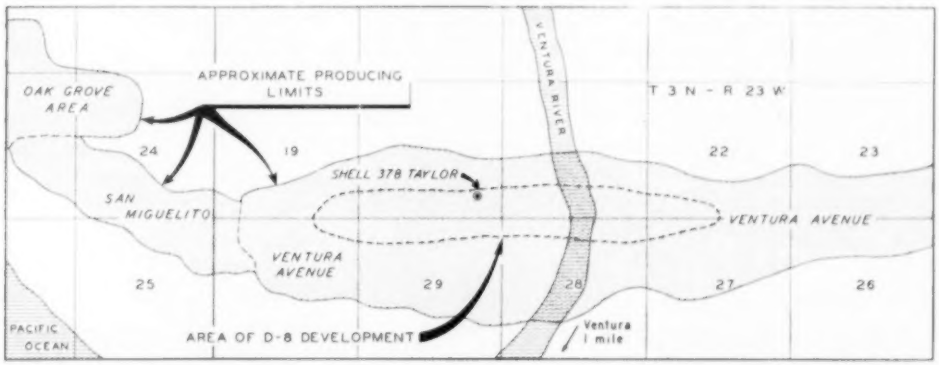
The D-8 zone was discovered prior to 1953 but active development was not undertaken until then. Averaging about 1,000 ft. thick, the pay is topped at depths between 10,500 and 13,000 ft. (see diagram). Approximately 25 producers have been completed in the stratigraphically deeper pay, extent of development of which is shown on the accompanying map. As only about 17 ft. of shale separates the zone from the overlying D-7, many of the wells have been completed in both the pays.

Extension of Ventura pays into San Miguelito field caused one of the most competitive drilling programs the field has ever witnessed. The two companies involved, Shell Oil Co. and Continental Oil Co., have kept about 10 rigs busy along the common boundary for the past 6 months. How far west these zones will extend into San Miguelito is yet to be proved but they could add a belt along much of the field's northern flank.

Miocene located . . . After years of drilling in Pliocene rocks, a Ventura well last summer drilled into Miocene sediments. The deep test, Shell 378 Taylor, drilled into the Miocene at about 14,000 ft. Two sands of sufficient importance to warrant setting liner to 15,436 ft. were encountered at 14,099-14,649 and 14,770-15,401 ft. Production tests yielded only salt water, according to field reports, but this could have been due to collapse of the liner at 13,600 ft. The well was plugged back and completed in the D-8.

Miocene oil production therefore has not been firmly established but in all probability such will be the case. Development of these pays, and of the D-8, D-7, and shallower zones not yet fully developed, should keep drilling activity at a high rate for years to come. And as development is progressively becoming deeper, wells in the below 15,000-ft. classification will be routine whereas last year only two Ventura wells reached this level.





Map at left shows extent of D-8 zone development and how exploration in western edge resulted in Ventura Avenue joining with San Miguelito. Diagram above shows a schematic section through the middle of Ventura Avenue. As shown, thrust faulting has led to duplication of the shallower zones. Below the new D-8 zone lie the yet-to-be developed Miocene formations.

December Totals Up 3 Per Cent

by John C. McCaslin

TOTAL completions in the United States in December showed a 3 per cent increase over the previous month, bringing to a close another record year for the industry. Total 1953 completions were 49,279 wells, compared to 45,821 in 1952. The industry also set a new footage record in 1953 with 198,838,631 ft. of hole dug.

All areas except the Appalachian producing region and the central states reported a record year. The most outstanding progress was made in the Rocky Mountain area. Drilling in that region increased about 45 per cent over 1952. More than 1,000 wells over the 1952 record were reported. About 83 per cent of all development wells drilled in the Rocky Mountain fields were successful. More than 17,000,000 ft. of hole was dug in this area to set the 1953 record, compared to about 12,000,000 ft. in 1952. Completion of the Platte pipe line and feeder lines into various producing areas greatly speeded up development throughout the region, particularly in Colorado, western Nebraska, and Wyoming.

Colorado's most important development area was Little Beaver field and adjacent new discoveries. Wyoming enjoyed a record in nearly every area, but that state's eastern section in Weston County continued to be the whole region's hot spot throughout the year and into early 1954. A total of 210 oil wells were completed in that county during 1953. Montana's most active development area continued to be East Poplar field. The most important development work in North Dakota was the evaluation program under way at Fryburg pool, the state's outstanding discovery of the year.

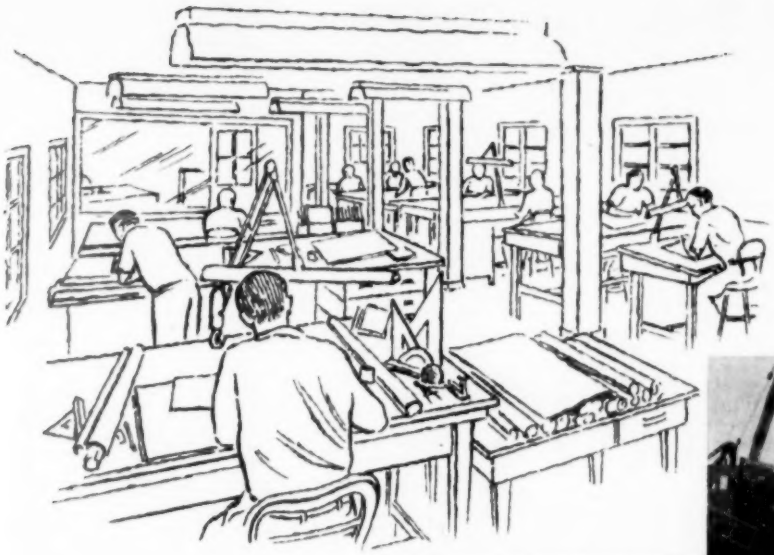
High drilling activity in Oklahoma during December resulted in 716 wells being completed, establishing a new all-time high for the month, and bringing to a close a new record year. Drilling in Oklahoma in 1954 is expected to continue high, and will fall only slightly under 1953 records.

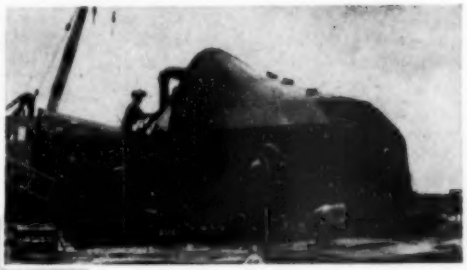
After trailing behind for 11 months of 1953 Texas completions picked up in December and went out in front of the previous year to set a new high. As the year ended West Texas' most active area continued to be northeastern Andrews County where the search for Ellenburger and Devonian oil continued at a fast pace. The trend in drilling in Coastal Louisiana in 1953 was towards new and deeper pays. Lafourche and Plaquemines parishes led the area in activity throughout the year.

SUMMARY OF COMPLETIONS, DECEMBER 1953

	Total comp.	Oil	Gas	Dry	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	10,000-12,500 ft.	Over 12,500 ft.	Total footage	Rigs and drilling
Ala.-Ga.-Fla.	10	1	0	9	0	5	5	0	0	0	50,273	14
Arkansas	53	25	0	28	18	25	9	1	0	0	189,475	38
California	219	154	3	62	47	95	39	21	13	4	959,842	253
Colorado	79	24	3	52	4	14	57	4	0	0	419,511	91
Illinois	247	148	1	98	67	180	0	0	0	0	639,779	399
Indiana	92	23	0	69	86	6	0	0	0	0	129,673	170
Kansas	360	156	18	186	43	297	20	0	0	0	1,273,292	359
Kentucky	108	37	23	48	72	36	0	0	0	0	210,102	75
Louisiana	215	136	17	62	72	26	32	31	40	14	1,323,318	393
North	115	75	10	30	72	15	24	3	1	0	365,270	157
South	100	61	7	32	0	11	8	28	39	14	958,048	236
Michigan	41	23	1	17	21	17	3	0	0	0	109,781	126
Mississippi	32	7	0	25	0	2	23	6	1	0	219,074	26
Montana	47	19	3	25	21	13	10	2	1	0	167,906	46
Nebraska	29	11	2	16	1	12	16	0	0	0	146,158	30
New Mexico	88	37	42	9	15	21	34	11	3	4	486,898	180
New York	60	30	0	30	60	0	0	0	0	0	78,000	65
North Dakota	25	16	0	9	4	4	1	15	1	0	165,293	29
Ohio	67	37	10	20	35	31	1	0	0	0	144,205	188
Oklahoma	716	452	35	229	280	308	68	46	13	1	2,511,047	629
Pennsylvania	90	25	26	39	66	5	18	1	0	0	218,484	190
Texas	1,401	783	60	558	353	543	325	137	28	15	6,203,488	1,242
North Central (7-B & 9)	531	278	3	250	241	196	92	2	0	0	1,708,471	351
West (7-C & 8)	317	230	0	87	35	115	104	39	15	9	1,713,184	355
Panhandle (10)	79	59	13	7	3	74	0	2	0	0	265,383	42
East (5 & 6)	74	28	15	31	11	26	28	9	0	0	373,774	123
Gulf Coast (2 & 3)	226	104	19	103	25	59	61	65	12	4	1,383,566	215
Southwest (1 & 4)	174	84	10	80	38	73	40	20	1	2	759,110	156
South Dakota	1	0	0	1	0	0	1	0	0	0	5,822	6
Utah	6	4	0	2	0	0	6	0	0	0	35,605	33
West Virginia	50	5	35	10	31	18	0	1	0	0	137,484	175
Wyoming	154	100	3	51	20	62	65	4	2	1	508,277	181
Miscellaneous	0	0	0	0	0	0	0	0	0	0	0	§9
Total Dec. 1953	4,190	†2,253	282	*7,655	1,316	1,720	733	280	102	39	16,332,787	‡4,947
Total Nov. 1953	4,048	2,134	309	1,545	1,413	1,530	734	248	87	36	15,672,867	5,820
Total 1953	49,279	25,762	3,806	19,711	15,221	20,045	8,686	3,508	1,379	440	198,838,631	
Total 1952	45,821	23,466	3,255	19,100	14,182	18,385	8,033	3,526	1,354	341	187,190,000	
W. Canada 1953 total	2,215	1,239	175	801							9,236,592	
Alberta	1,416	835	138	443							6,485,259	
Saskatchewan	619	337	16	266							2,290,163	
Manitoba	90	67	1	22							231,352	
N.W.T.-British Columbia	90	0	20	70							229,818	

*Incl. 100 service wells: Calif. 9, Kans. 5, N. Y. 30, Ohio 5, Okla. 11, Pa. 25, N. Tex. 13, S.W. Tex. 2. †Incl. 29 condensate wells: Ark. 1, Calif. 1, S. La. 6, Miss. 1, Okla. 5, Gulf Coast 12, S.W. Tex. 3. §Incl. all wells rigged up and/or drilling at month end. ‡Incl. Nev. 9.





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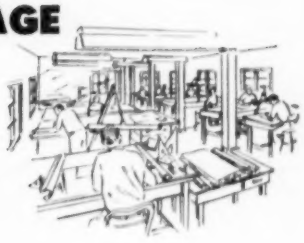

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Wildcat Completions, December 1953

	Total	Oil	Gas	Dry	Footage	1953 Total Comp.	1953 Total Footage (1,000 ft.)	1952 Total Comp.	1952 Total Footage (1,000 ft.)
Kansas	66	8	2	56	258,136	887	3,383	845	3,292
Oklahoma	51	7	5	39	255,228	742	3,304	730	3,452
Texas	409	68	5	336	2,040,687	5,245	25,847	4,851	23,444
North Central	164	34	1	129	596,366	2,120	7,624	2,083	7,063
West	72	13	0	59	426,011	876	5,254	870	5,211
Panhandle	3	0	0	3	21,837	26	148	80	482
East	29	6	0	23	134,251	300	1,510	252	1,369
Gulf Coast	79	9	4	66	570,565	888	6,348	726	5,433
Southwest	62	6	0	56	291,657	1,035	4,963	840	3,886
Louisiana	39	10	1	28	386,025	513	4,537	401	3,398
North	12	1	0	11	68,608	177	1,025	195	1,161
South	27	9	1	17	317,417	336	3,512	206	2,237
Mississippi	16	0	0	16	116,745	207	1,468	182	1,327
Ala.-Ga.-Fla.	7	0	0	7	39,552	112	616	50	268
Arkansas	10	0	0	10	26,153	140	493	97	427
Nebraska	17	3	0	14	74,615	161	804	168	732
Colo.-Utah-Wyo.-Mont.	85	5	0	80	375,648	721	3,854	566	2,942
North Dakota	11	2	0	9	47,339	91	463	36	254
South Dakota	1	0	0	1	5,822	20	103	14	48
New Mexico	8	3	1	4	41,415	168	1,121	165	1,101
California	65	12	3	50	250,105	666	3,115	597	2,772
Tri-States	82	2	0	80	149,042	1,011	1,953	1,386	2,931
Others	23	5	4	14	74,122	378	1,085	464	1,237
Total December 1953	890	125	21	744	4,140,634	.....	.....	.....	.....
Total November 1953	852	118	28	706	3,967,822	.....	.....	.....	.....
Total 1953	11,062	1,575	367	9,120	52,146,414	11,062	52,146		
Total 1952	10,552	1,488	268	8,796	47,625,217	.....	.....	10,552	47,625

December Ends Record Wildcat Year

by John C. McCaslin

WILDCAT completions in the United States in December were up slightly over the previous month, and the 890 test wells completed boosted 1953 totals to a new record of 11,062, up 510 over 1952. The industry set a new wildcat footage record in 1953 with more than 52,000,000 ft. of exploratory hole drilled. Total wildcat footage drilled in 1952 was 47,625,217. The industry failed to drill the 11,371 wildcats forecast for the year, but set a new record anyway.

The central portion of the Williston basin highlighted the month's activity. An important gas discovery in Seward County, Kansas, has given the green light for deeper exploration in the Hugoton gas field area.

Williston basin . . . The central portion of the basin has indications of receiving an important strike at Gulf Oil Corp. 1 Government-Dorough in the Trotters area of Golden Valley County, North Dakota. Gulf recovered oil from the Mission Canyon and later found shows in a series of Madison cores.

Other significant wildcats are drilling in the area. About 21 miles southwest of the Gulf wildcat, Blackwood & Nichols have a tight test under way. To the west in Wibaux County, Montana, Lion Oil Co. has another tight hole drilling. Unconfirmed reports stated that the well recovered a substantial quantity of oil on tests of the Madison. This well is about 15 miles west of the Blackwood & Nichols well.

A great deal of seismic exploration has been done in this area for the past 3 years. Fryburg and Brorson pools are the first successes on seismic prospects in the Williston basin. Fryburg produces from Madison, with Heath production indicated. The Ordovician produces at Brorson pool. All three of the wildcats mentioned above are due to test the Ordovician.

The third well in the Fryburg area reported recovery of 2,114 ft. of black oil on drill-stem test of the Heath, the second well in this pool to find Heath possibilities. The well is 1 mile southeast of the second well drilled in the area, the confirmation, which found Heath shows but was completed in the Madison.

Stanolind Oil & Gas Co. completed its first successful wildcat in North Dakota at 1 Star in McKenzie County for 550 bbl. of oil daily from the Devonian, establishing a promising new pay for North Dakota, and also becoming the state's deepest producing well. Another Devonian well was finaled in Beaver Lodge field by Amerada Petroleum Corp. at 2 Kvam. This well is the state's deepest hole at 14,600 ft.

Carter Oil Co. et al recovered 415 ft. of free oil on tests of the Mission Canyon at the Carsin area wildcat in Dunn County, about 20 miles southeast of Nesson anticline production.

Hugoton embayment . . . An important gas discovery for the future of deep drilling in the Hugoton field area of Oklahoma, Kansas, and Texas was made by Cities Service Oil Co. at 1 Holt "B," Seward County, Kansas.

The discovery, located in vast Hugoton field itself, flowed at the rate of 17,700 M.c.f. of gas per day from the lower Topeka limestone formation of Pennsylvanian age at a depth of 4,200 ft., and since that time has flowed more than 26,000 M.c.f. per day. This is the first production established from this formation in the big field, which is a Permian producer. Nearest production from this new zone is in the prolific Greenwood gas area 45 miles to the west in Morton County. Three other prospective producing zones deeper than the regular Hugoton pay will be tested before the well is finally completed. Greenwood pool was extended into Colorado late in December, making it a two-state field, and establishing first commercial production in the southeastern Colorado portion of the Anadarko basin.

Other Pennsylvanian discovery news in the Hugoton area includes a deep

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Midland, Texas

Rocky Mountain States
Room 101, 7 N. 33rd
Billings, Montana

Illinois Basin
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new strike in the Texas Panhandle at The Texas Co. 1 Blakemore in Hansford County, more than 4,000 ft. deeper than the regular Hugoton field pay. The Morrow gas discovery was completed for 6,800 M.c.f. or gas per day at 7,356-70 ft. Later in the month Humble Oil & Refining Co. completed its 1 Jackson just 10 miles from the Blakemore well in the Douglas sand of Pennsylvanian.

The Douglas sand belongs to the same part of the Missouri series as the Topeka and Lansing pay of Greenwood field in Kansas. The gas at this well was found in a pay 2,000 ft. below regular Hugoton pay. The deep Seward County, Kansas, strike and this latest Pennsylvanian hit in Texas appears to indicate untold possibilities of Pennsylvanian production throughout the Hugoton area.

ILLINOIS

Miami Operating Co. 1 William J. Crawford, NW NW NE 24-8s-7e, 3 miles northeast of Eldorado in Saline County. The Aux Vases flowed oil at the rate of 4 bbl. hourly from 2,900-05 ft. Flow was through ¼-in. choke after acidization. The Tar Springs may also be a pay zone in the well.

A new pool seems apparent 5 miles southeast of Clay City in SE NW SE 11-2n-8e, Richland County at Don Baines 1 Ira Diel. Pump is being installed after swabbing 11 bbl. of oil per hour after acidization in the Rosiclare at 2,990-3,000 ft. The east offset to the discovery, the 1 Longest, came in for 17 bbl. of oil per hour natural from the Rosiclare, also. A southeast offset is drilling.

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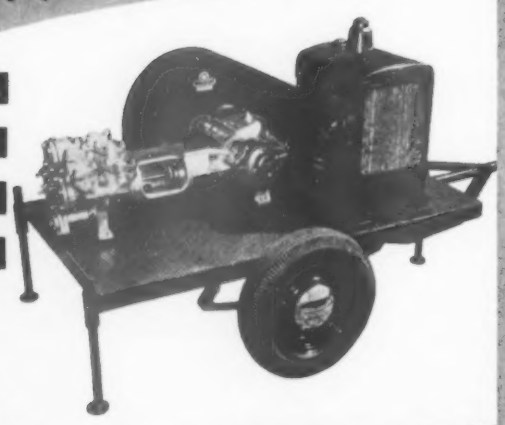

SALT WATER DISPOSAL

WATER FLOODING

CRUDE GATHERING

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FIG. 535
SKID OR TRAILER MOUNTED

SPECIFICATIONS

Piston	Stroke	BPH	PSI	HP	Wt. Lbs.
2"	5	35	900	15	700
2½"	5	56	520	15	700
3"	5	83	350	15	700
3½"	5	115	255	15	700

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CANADA

Good Oil Show Reported At Manitoba Prospect

Crawford E. Smith Drilling Co. obtained an encouraging show of light-gravity crude oil at its initial exploratory venture in southwest Manitoba, and has set production casing for evaluation tests.

This wildcat, 1 John Lucien Canart, LSD 6, 16-11-29w1, 11 miles northwest of Daly oil field, 20 miles west-northwest of Roselea oil producers and 63 miles west of Brandon, found its oil encouragement in the Mississippian. The Canart well was taken down to 2,570 ft., after topping the Mississippian at 2,427 ft. (K.B. elevation 1,750 ft.). First test, from 2,431-41 ft., for ½ hour, gave up 60 ft. of slightly oil-cut mud. Test from 2,447-70 ft. for 30 minutes, was a misrun; while test from 2,488-70 ft. gave up 2,050 ft. of muddy gas-cut salty sulfurous water in 50 minutes. A later straddle packer test from 2,446-2,545 ft. for 97 minutes, yielded 40 ft. of highly oil-cut mud. Crew has set string of 6⅝-in. production casing and will production test the indicated Mississippian oil zone.

Roselea area . . . Souris Valley Oil Co., Ltd., Manitoba independent, and two Alberta companies, Security Freehold Petroleums, Ltd., and McIvor Drilling Co., Ltd., have been assured of Mississippian oil success at their diagonal offset to the Cal-Standard Scallion discovery in the Roselea sector of southwest Manitoba. Preparations are being made for production tests at this well, and rig is being moved for a ¼ mile east offset to the new oil well.

The well, Souris Valley-Security Freehold-McIvor 15-2 Drynan, LSD 15, 2-11-26w1, is ⅜-mile southeast of the Scallion well and 2½ miles northeast of other Roselea oil wells. Hole was taken down to 2,030 ft., and 1-hour drill-stem test in the Mississippian gas up 1,100 ft. of gasified oil, no water.

Saskatchewan . . . Socony-Vacuum Exploration Co. has been assured of medium gravity oil production in the Roseray sand at its ¾ mile south extension venture in the South Success oil producing area of southwestern Saskatchewan.

This new oil well, Socony-Woodley-Southern 26-16B, South Success, LSD 16, 26-16-16w3, was rated as an oil success upon completion of the second drill-stem test in the Roseray sand horizon. That test, from 3,181-91 ft. flowed gas in 15 minutes and gave up 1,150 ft. of clean 23.6°-gravity crude during 16 hours. Previous test in the top of the formation, of interval 3,158-76 ft. flowed gas at about 5,000 cu. ft. daily, but did not give any pipe recovery. Hole completed at total depth 3,445 ft. and string of production casing is being run to plugged back depth 3,345 ft.

Alberta . . . The California Standard Co. is moving in drilling equipment to the northwest reaches of Alberta for a deep test well on Crown Reservation lands held under exploration permit by the company. This wildcat is in the Shekilie River area, 34 miles southwest of Bistcho Lake, 50 miles northwest of Hay Lake and around 465 miles northwest of Edmonton.

The new wildcat, California Standard 9-26

a nose for business

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AERO DESIGN Commander

AERO DESIGN AND ENGINEERING COMPANY
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Shekilie River, LSD 9, 26-120-11w6, is 32 miles north of Imperial 1 Zama Lake abandonment and 68 miles west of Sun Oil Co.'s 6-11 Russett Creek driller. Hole is scheduled to go down to about 7,500 ft.

EASTERN CANADA

Gaspe . . . In the Gaspe Peninsula, Quebec Province, two tests sponsored by Gaspe Oil Ventures of Montreal and associate companies are still active. The 1 asphalt base, deepened to 2,055 ft., is drilling out lost bailer and backfill. The 1 Tar Point is repairing equipment with gas production continuing from 7,069 ft.

ROCKY MOUNTAIN

WYOMING

South Manderson Tensleep Discovery Testing

L. J. Peterson swabbed at the rate of 140 bbl. of oil per day at 2 Wycol-Government, C SW NW 1-49n-92w, in the South Manderson area of Big Horn County. The well produced from Tensleep, a new pay for the area, where production is generally from Phosphoria. The formation was fractured before test. The apparent new pay discovery is ½ mile east of the pool discovery which produced from Phosphia. It will be completed in Tensleep despite good Phosphia shows since sulfur extraction facilities are not available to handle output of the area.

Lincoln County Wildcat Staked

El Paso Natural Gas Co. and Continental Oil Co. have announced location for a test to Nugget in the Fontenelle area of Lincoln County. The wildcat, 1 Unit is in W½ SE NW 11-24n-113w, and is on a block of about 8,400 acres just south of LaBarge field. El Paso has not previously been active in the area but has been steadily extending operations to the north of the San Juan basin as interest and resulting drilling with encouraging results has been apparent in western Colorado, Utah, and southwest Wyoming.

Beaver Creek Madison Discovery Flowing

Stanolind Oil & Gas Co. reported a flow of 341 bbl. per day at 30-M, S½ NW NE 10-33n-96w, Madison discovery in Beaver Creek field, Fremont County. Test was through 8/64-in. choke, and oil is 42°. Top of Madison, the sixth producing horizon for this substantial field was logged at 11,204 ft. Casing was landed at 11,406 ft. with production from open hole. Early open flow tests of the well were gaged at the rate of 41 bbl. of oil per hour.

Niobrara County Discovery Testing

R. L. Manning, Cosden Petroleum Corp. and Wind River Oil Co. have reported a flow gage of 350 bbl. of oil daily through 26/64-in. choke at 1-A Government-Maule, C NW SW 3-40n-66w, northern Niobrara County.

The well was reported as a discovery in Newcastle sand 7,732-48 ft. a week ago. Tests initially showed a flow rate of 25 bbl. of oil per hour through tubing. The well is the first to find production on the Weston County trend southward into Niobrara County.

Two miles further south H & H Drilling & Oil Co., Newcastle is testing 1 Government, C NW NW 14-40n-66w. The well is reported flowing to pits with no gage available. Production is from Newcastle at 7,619-34 ft., and tests followed fracturing of the formation.

A substantial drilling program into Niobrara County prospects is foreseen by area operators on the basis of new interest created by the two discoveries.

Dakota Has Gas Show At Tip Top Wildcat

General Petroleum Corp. is running test of the zone 8,107-22 ft. at 18-20 Unit, SW SW SW 20-28n-113w, in the Tip Top area of Sublette County. Top of Dakota was found at 7,932 ft. and a core 8,089 ft. contained 5 ft. of sandstone of slight porosity, but with good odor and bleeding gas. Casing has been landed at 7,190 ft. The well made gas at the rate of 1,400 M.c.f. per day from Frontier at 7,225-61 ft. The well is about 2½ miles southwest of General Petroleum's 1951 oil discovery in the Tip Top area where production is from the Nugget sand.

COLORADO

Weld County Deep Test in Lyons

The California Co. is coring below 8,922 ft. at 1 Winder, C SW NE 4-6n-57w, Lyons (Permian) test southwest of previous production from this formation in the Denver-Julesburg basin. The operator made the hole tight as Lyons was neared, and no data is now being released. A core 8,898-8,922 ft. not been described, but is believed to contain top of Lyons. The well is southwest of Black Hollow field where an apparently substantial area is under development to this horizon.

Mountain Fuel Supply Co. has completed the second well in the Sugarloaf area of Moffat County, Colorado, for a flow of 7,130 M.c.f. of gas per day from the Mesaverde at 5,018-61 and 5,112-68 ft. (Arrowed on map.) The discovery well in the area was completed last year for a gage of about 5,000 M.c.f. per day. Its successful completion opened further exploration to the Mesaverde through northwestern Colorado and other parts of the Green River basin.

NORTH DAKOTA

Mountrail County Location Staked

William Herbert Hunt has made location for a wildcat at 1 Anderson, C NW NE 25-157n-89w, 13 miles northeast of the town of Stanley, Mountrail County. The well is the second in a series to be drilled by this operator on a block of approximately 12,000 acres controlled equally by Hunt and by Stanolind Oil & Gas Co. The well will test Silurian at about 9,850 ft. At the first in this series, 1 Dunham, C NW NW 24-155n-90w, Hunt is drilling below 9,450 ft. on the well to about 10,000 ft. in Ordovician. The well was originally scheduled only to Mission Canyon.

Southeastern North Dakota Wildcats Planned

Calvert Exploration Co. of Olney, Illinois has taken farmout from Hunt Oil Co. and will drill four wildcats in McIntosh County, in southeastern North Dakota. All four will go to granite at about 4,200 ft. Contributions will be made by Socony-Vacuum Oil Co., Atlantic Refining Co., Sinclair Oil & Gas Co. and Superior Oil Co.

Show Logged In East Poplar Wildcat

Richfield Oil Corp. reported recovery of 50 ft. of oil on drill-stem test of the B-1 Zone of Madison at 1-A Tribal, C SW SW 6-29n-51e, in the East Poplar area of Roosevelt County. Test was of the zone 5,793-6,011 ft. and recovery after 2 hours included 50 ft. of mud in addition to the oil. Flowing pressure was 0-310 psi. The well is 1½ miles east of production at East Poplar. Richfield is drilling below 6,160 ft.

WESTERN NEBRASKA

Two Nebraska Discoveries Completed

Pubco Development Co. reported pump gage of 190 bbl. of oil per day at 2 Franzen, SW SE NW 25-15n-48w, southeast of Cook field, Cheyenne County, Nebraska. The well was rated at 500 bbl. per day by the operator, but pump capacity is about 190 bbl. per day. Production is from "D" sand. The well is on a separate geological feature, about ½ mile east and south of Cook pool.

In Kimball County, Stanley T. Kiespert has completed 1-A Long, NW NW SE 10-12n-55w for a flow of 185 bbl. of oil per day through 13/32-in. choke. Production is from "D" sand. The well is just north and east of Long Pool. It was drilled on farmout from Superior Oil Co. and Superior is starting a confirmation.

Eddie Fisher, Colorado independent is still testing at another discovery in this area, 1 Harris, SW SE NW 11-12-55w, which found production in "J" sand. The well flowed at the rate of 20 bbl. of oil per hour on first tests.

UTAH

Bluff Unit Wildcat Has New Show

Three States Natural Gas Co. recovered heavily oil-cut mud on test of 1 State, C SE SW 32-29s-23e, in the Bluff Unit, San

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New $67,000,000 FALCON DAM throttles precious water to supply year-round flow to long-dry Rio Grande River

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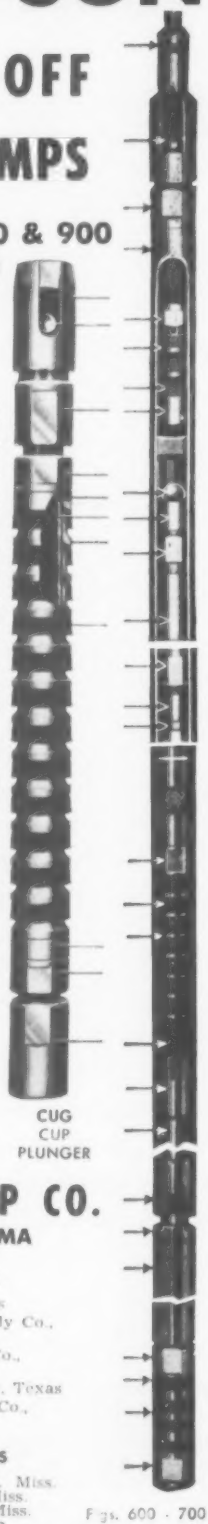

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Figs. 600 - 700
Figs. 800 - 900

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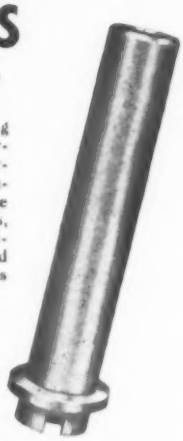

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Juan County. The operator tested the interval 7,532-50 ft. and there was carbon dioxide gas at surface in 5 minutes, at the rate of 3 million cu. ft. per day. Recovery in pipe was 370 ft. of oil and gas-cut mud, 150 ft. of gas and mud-cut oil, 60 per cent oil, and 50 ft. of oil and gas-cut mud and water. Tool was open for 3 hours. Tests are continuing to present depth of 7,639 ft. Last top reported was that of the Leadville (Mississippian) at 7,435 ft. Previous shows in this well indicated a possible discovery for the Paradox basin area.

TEXAS

WEST TEXAS

Offset Test Dry in Butler-Devonian Pool

Operators ran electrical surveys and prepared to abandon at Deep Rock Oil Co. et al 1 Newton, ½-mile east offset test to L. M. Glasco et al 1 Butler, prolific discovery in northeastern Andrews County. Top of the Devonian in Deep Rock's well was tentatively picked at 12,705 ft. by samples, which checked about 160 ft. low structurally to the discovery.

Drill-stem test at 12,708-12,719 ft. recovered 20 ft. of mud with no shows, and at 12,717-12,728 ft. recovery included 7,000 ft. of salt water.

North of the discovery, Plymouth Oil Co. 1 Butler swabbed 2 bbl. of new oil an hour, plus 10 per cent fresh water, after acidizing the Devonian through perforations from 12,593-12,603 ft. and in open hole from 12,065-12,616 ft.

Andrews County . . . Continental Oil Co. had two extension wells in prospect for the Prichard field. On the northeast side Continental 1-48 University flowed 30 bbl. of oil with no water in 3 hours on drill-stem test in the Devonian from 12,540-12,682 ft.

Southeast of the field's present limits, and also southeast of the field Ellenburger discovery, Continental 1-8-1 University tested 152 bbl. of oil in 34 hours through 1-in. choke. The Devonian had been perforated and acidized from 12,438-12,525 and 12,536-12,586 ft.

Upton County . . . Operators at Gulf Oil Corp. 1-AE TXL prepared to core ahead following the fifth consecutive successful drill-stem test of the Ellenburger. The last test reported was run from 12,424-12,451 ft., which recovered 120 ft. of heavily oil-cut mud, 203 ft. of clean oil and another 85 ft. of oil and gas-cut mud. Operators prepared to core ahead. Top of the formation was 12,258 ft.

Hunt Oil Co. completed its 1 Velma Tippett Amacker, Ellenburger discovery southeast of the above well, and staked location for a 1-mile southeast outpost test to its new production.

No. 1 Amucker completed for a flowing potential of 416 bbl. of 53° oil a day through ¼-in. choke, from open-hole between 11,983-12,127 ft., total depth. Top of the Ellenburger was 11,950 ft. on elevation of 2,787 ft.

Hunt's offset test will be 1-62 Amacker, located in 62-Y-TCRR Survey.

Ector County . . . Cities Service Oil Co. 1-J Cummins, indicated Fusselman discovery at 7,728-85 ft., recovered 990 ft. of clean oil and 570 ft. of oil and gas-cut mud on drill-stem test of the McKee sand between 8,514-50 ft. Top of the McKee was placed at 8,350 ft. by samples, minus 5,085 ft., which was said to be about 300 ft. high structurally to Humble Oil & Refining Co. 1 Cummins, dry hole ¾-mile to the northeast.

TEXAS GULF COAST

Second Pay Zone Opened For North Madisonville

A new pay zone, productive of gas and condensate, has been opened in the North Madisonville area, 7 miles west of Madisonville, in Madison County, with completion by J. M. West of his 1 Poteet et al in the Sub-Clarksville formation of upper Cretaceous age.

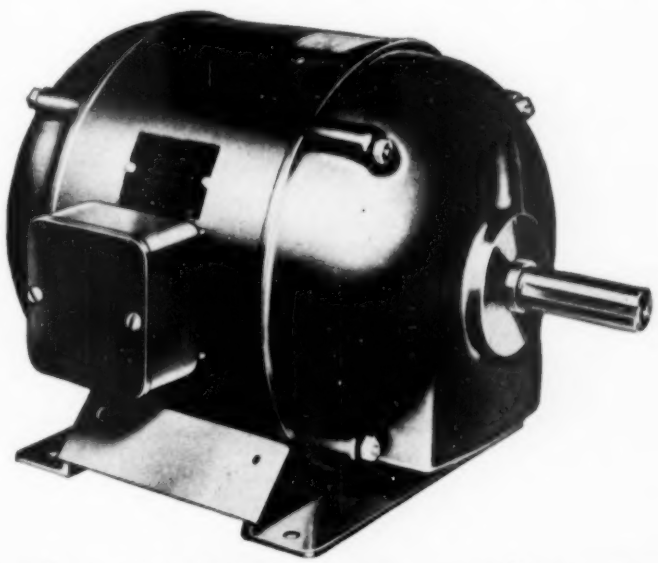
The new well, second for the area, is 2,750 ft. northwest of the discovery producer, completed by the same operator in September 1950, and productive from the deeper Lewisville former of upper Cretaceous-Woodbine age.

The new gas well is estimated good for 6,000,000 to 7,000,000 cu. ft. of gas and 30 to 35 bbl. of condensate daily on open flow. Production is from open hole at 8,151-8,272 ft. The discovery well produces from a sand interval at 8,604-10 ft. The latter well was completed as a gas producer but was reclassified in July 1951 when it started producing 45.6°-gravity oil.

SOUTHWEST TEXAS

New Gas Field Opened

Open-flow potential of Edwin Singer's newly completed gas-discovery well, 1 Misenheimer, at Presenos, 2 miles southeast of Al Smith, in Jim Wells County, has been placed



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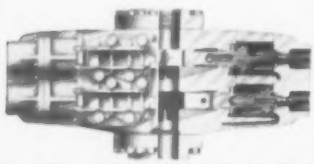
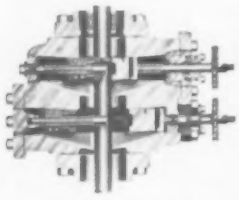


Shaffer Hydraulic Cellar Control Gates—available in both **Double** (two ram compartments unitized into **one** body) and **Single** types—are operated by hydraulic fluid under pressure.

- Even in sizes as large as 13⅝" (12" Series 900), the Double Gate requires only 30" total overall height—the Single Gate only 18½". Smaller sizes even less!
- Rams are quickly changed by simply opening doors in the side of the body, replacing the rams and bolting the doors shut again. **And rams can be changed whether pipe is in or out of the hole!**
- Direct Hydraulic Drive (no complex secondary connections between pistons and rams)—Completely Enclosed Design (no exposed operating parts to become damaged)—Quick-Draining Compartments (no detrimental mud accumulations to interfere with free ram travel) . . . these and many other features make these Gates unequalled for modern pressure control operations.

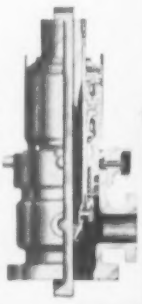
Mechanical Cellar Control Gates



Shaffer Mechanical Cellar Control Gates—also available in both **Double** and **Single** types—are operated by synchronized screws rotated by a compact motor drive—or can be operated manually.

- Even in sizes as large as 13⅝" (12" Series 900) the Double Gate requires only 28½" overall height—the Single Gate only 17⅜". Smaller sizes even less!
- Rams are easily changed by removing only **one** end cover to replace **complete** ram assembly!
- Quick-Draining Ram Compartments—Pack-Off Assisted by Well-Pressure—Simple, Positive Operation . . . these and many other features make this equipment the ideal solution for many pressure control applications!

Rotating Blowout Preventers



The Shaffer Combination Rotating Blowout Preventer and Stripper combines—in **one** unit—the necessary features for pressure control while the drill string is in the hole.

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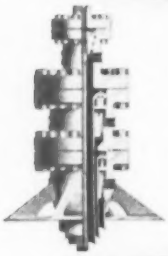
Two Types — Type 50 for drilling through 10¾" casing or larger . . . Type 51 for slim hole drilling, production jobs, etc. Both have same basic features.

Well-Head Equipment



Shaffer Landing, Casing and Tubing Suspensions are available in a selection of sizes and types to meet every requirement.

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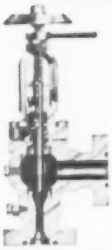
- Shaffer also provides a full line of modern Tubing Heads (including new Annulus Head designs), Multiple Zone Hook-Ups, and other equipment to complete your pressure control installation—anywhere in the world!

For Flow Control



Shaffer Adjustable Flow Beans—pioneers in the field—offer unique advantages found in no comparable equipment.

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at 66,000,000 cu. ft. per day. Productioon is from a sand interval at 5,442-47 ft. (casing perforations), in hole drilled to 5,595 ft.

Oil Production Spreads In Cayo del Oso Field

Forest Oil Corp. has completed another good producer for the steadily expanding Cayo del Oso field, on the west shore of Corpus Christi Bay, southeast of Corpus Christi, Nueces County. The new well, 4 Wagner, flowed 154.56 bbl. of 43°-gravity oil per day on completion gage through 7/64-in. choke. Sand interval is 6,639-41 ft. The field was discovered early last summer.

New Beaurline Reservoir Produces Gas-Condensate

Sunray Oil Corp. has opened a gas-condensate producing reservoir in its new Beaurline field, in southern Hidalgo County, with the completion of its 3 Beaurline, flowing at the rate of 8,600,000 cu. ft. of gas daily with a gas-condensate ratio of 167,000 cu. ft. per barrel.

Produciton is from a Frio sand, open through casing perforations at 5,545-56 ft., more than 100 ft. shallower than the field's oil-producing reservoir, opened last August. Location is 4,550 ft. northwest of the oil-discovery well. The new discovery is in an old hole, drilled in 1948 to 8,506 ft.

TEXAS PANHANDLE

Third Douglas Sand Discovery Indicated

A third Douglas gas sand discovery was in prospect for Hansford County as Humble Oil & Refining Co. 1-B Collier, 35-1-WCRR Survey, flowed gas. A drill-stem test from 4,578-4,636 ft., open 1 hour, had gas in 18 minutes, estimated at 2,000,000 cu. ft. daily. Shut-in pressure was 1,305 psi. in 20 minutes.

Location of the well is 1 mile south of shallow gas production in the Hugoton field, 16 miles northeast of Humble 1 Jackson, and about 10 miles north of The Texas Co. 1 Blakemore. Both of the latter wells are Pennsylvanian discoveries.

EAST TEXAS

Smackover Wildcat Scheduled for Wood County

East Texas continues to draw deep exploratory tests. Last week locations were made for a 13,000-ft. Smackover wildcat 4 miles east of Yantis, in the Yantis field, and for a Travis Peak test on the west edge of the Gregg County portion of East Texas field.

The deep venture is Humble Oil & Refining Co. 2 Yantis Gas Unit 3, in the Jesse Walker Survey. Its location is about midway between Smackover production recently opened in Franklin County southwest of New Hope field and the one-well Ginger (gas) pool in Rains County.

The Travis Peak test, still in the planning stage at this report, is expected to be drilled on a lease of approximately 1,100 acres recently taken from C. C. Crews by C. W. Lutes and Paul Harding of Longview. This land lies in the Leonard Perkins Survey, west of East Texas field production.

Tide Water Associated Oil Co. 1 Ramey Unit, Smackover discovery in the New Hope area of southern Franklin County, has been given a potential of 42,500,000 cu. ft. of gas

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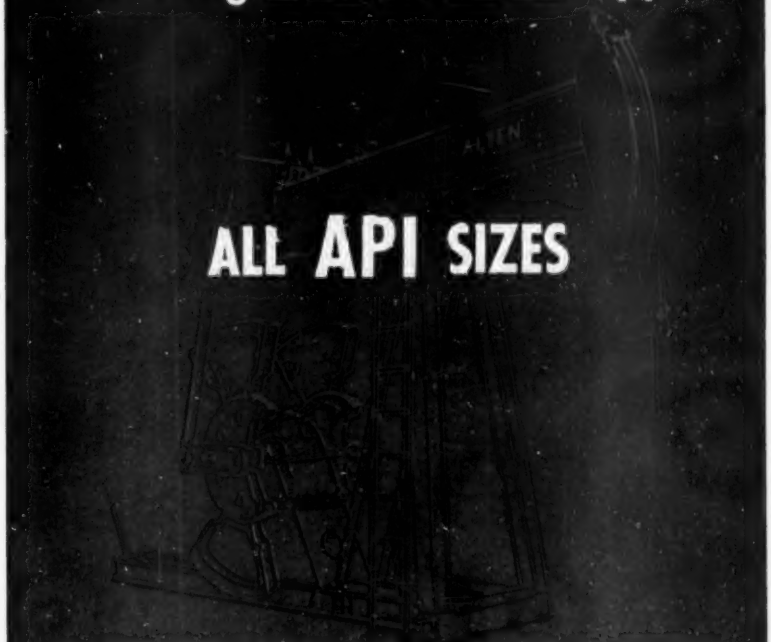

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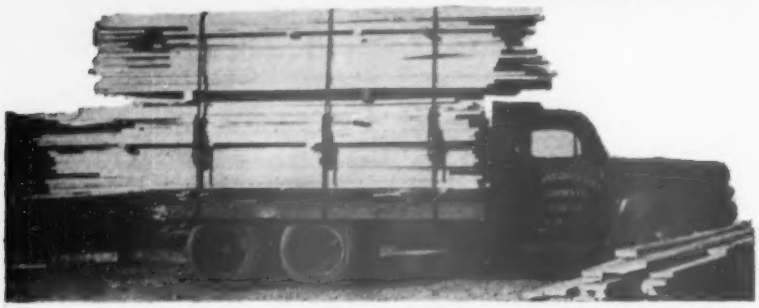

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a day plus 148 bbl. of distillate per 1,000,000 cu. ft. This test was through 15/64-in. choke. Tubing pressure was 3,056 psi. and gravity was 61°. Pay section is the Smackover limestone between 12,086-12,341 ft.

OKLAHOMA

New Lincoln Strike

Davidor & Davidor 1 Neill, Lincoln County discovery in the SE SE NE 16-15n-3e, 2½ miles southeast of Carney, has established an excellent flow rate of 30 bbl. per hour from perforations in the lower Skinner sand at 4,253-59 ft. After fracturing the well flowed load oil and then 30 bbl. hourly per hour of new oil on 6/64-in. choke.

Completion Due at North Jarvis Well

Union Oil Co. of California and Sun Oil Co. are ready for completion at the third successful well in new North Jarvis Simpson pool in Grant County.

The 1 Conrady, NW NW SW 28-29n-6w, flowed 115 bbl. of oil in 10 hours on ½-in. choke from perforations in the Simpson sand at 5,245-75 ft. Oil is 47.1°-gravity.

Big Development Under Way at Lincoln Field

E. L. Oliver has a heavy field development program under way at Southeast Sunflower field in Lincoln County.

The latest big well in the fine pool is Oliver 3 Ebert, NW NE SW 21-14-2e, flowed 250 bbl. of oil per day natural. Production is from the Checkerboard sand through perforations at 3,872-84 ft. with flow through ¾-in. choke. The well was then choked down to 45 bbl. per day on 8/64-in. choke with tubing pressure of 1,400 psi. Several other wells are drilling in the area, one testing.

High Hourly Flow Rate At Garvin Discovery

A high flow rate is established at a Garvin County discovery well, Sun Oil Co. 1 Caldwell, SW SE NE 4-4n-2e.

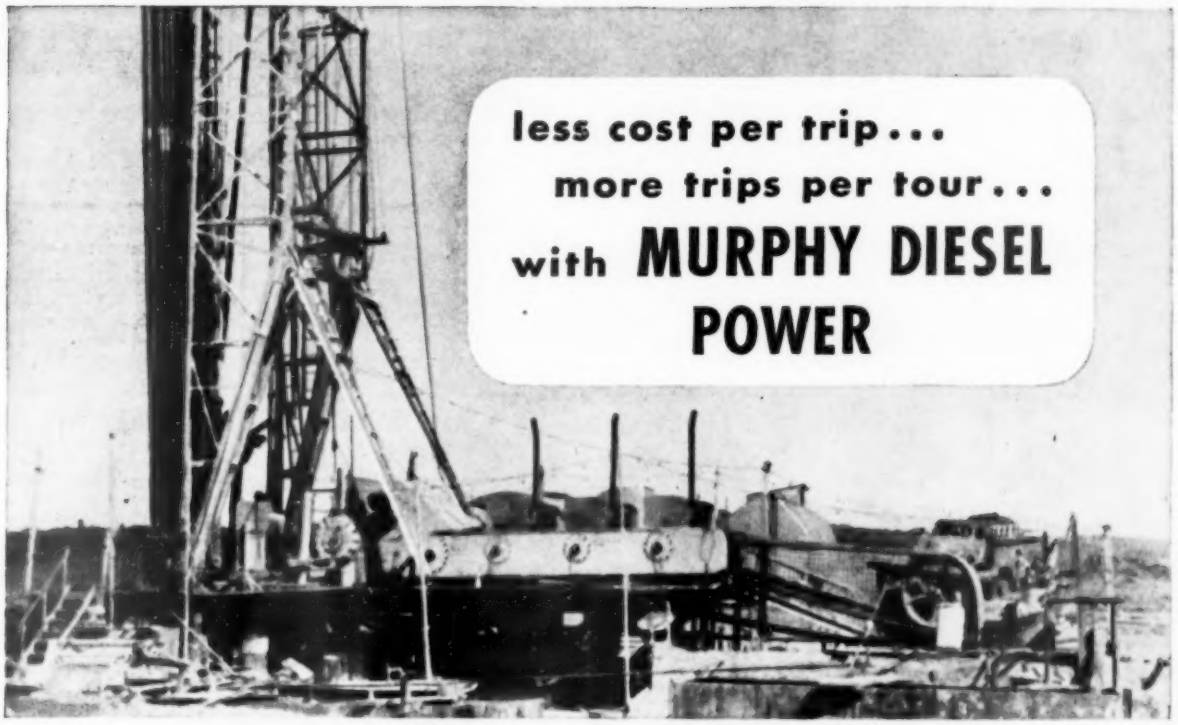
The casing was perforated at 3,400-20 ft. and the well swabbed in. It kicked off and flowed 398 bbl. of 41°-gravity oil in 4¼ hours on ¾-in. choke from the basal Pennsylvanian sand.

Carter Oil Co. 1 Hunter, C NE SW 19-3n-3w, Northeast Purdy pool, Garvin, flowed 139 bbl. of new oil in 6 hours on ¾-in. choke with some gas. Production is from the Springer perforations at 8,432-75 ft. Another well in the pool, Sinclair's 2 Cook, C SE NE 2-3n-4w, flowed 74 bbl. of oil in 10 hours from the Springer sand and 97 bbl. of oil in 24 hours from the Hart sand.

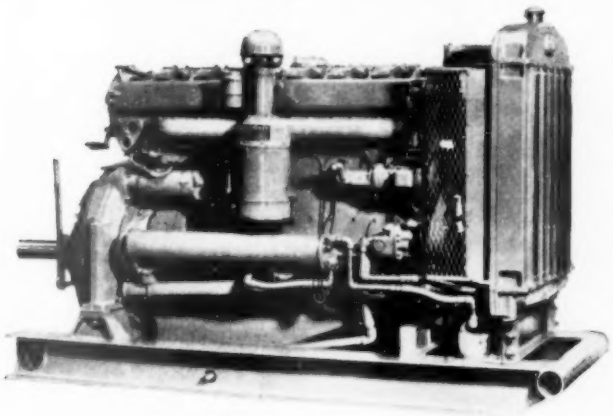
New Creek Discovery

Empire Oil Corp.-Kirshner Bros.-W. S. Bogie have a new Red Fork sand discovery at 1-B Bunting in Creek County near Kellyville in the SE NW NW 3-16n-10e.

After fracturing the well flowed 100 bbl. of new oil in 1 hour. Flow was through 5½-in. casing and 2-in. flow line. Gravity is 34° to 36°. The discovery is shut in for tankage. Operator will run tubing as there was none for above test. The new pool is 2 miles from nearest production. Top of Red Fork



Taylor Drilling Co. profits by these Murphy advantages in Montana oil field



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was 2,074 ft. Nearest production is from the Prue sand.

KANSAS

Pump Going Up at Phillips Discovery

Sohio Petroleum Corp. is putting up pumping equipment after swabbing 46 bbl. of oil hourly for 2 hours at 1 Krause, SE SE SE 1-4s-19w, 2½ miles east of Beckman pool and 4 miles southwest of Phillipsburg in Phillips County, northern Kansas. Production is from the Lansing.

Western Area of State Has Significant Year

Significant increases in activity and development of western counties in Kansas last year highlighted the whole state's exploratory program.

Three new counties were opened to production in Kansas in 1953, Thomas, Comanche, and Gray, the 77th., 78th., and 79th., respectively, in the state.

Thomas County's first production was opened at Trans-Mex 1 Keller, NE NE SW 19-9s-32w, with a pump potential of 50 bbl. of oil per day from the Mississippi. First Comanche County production was opened at Barbara Oil Co. 1 Robbins, SE NE NW 23-31s-16w, flowing 6,800 M.c.f. of gas per day from the Mississippi, opening Robbins Ranch pool. The recent opening of Jumbo pool opened Gray County production. United Producing Co. 1 Salmon, C SE NW 29-29s-27w, was completed with a pump potential of 10 bbl. of oil per day from the Mississippi.

Good Confirmation Well in Decatur

H. E. Zoller and E. K. Carey Drilling Co. have confirmed Monaghan pool in northern Decatur County at 1 Pelkey, NE SE SE 16-2s-27w, northwest diagonal offset to the pool discovery well which was completed in 1952.

The new well swabbed 26 bbl. of oil per hour after acidization of perforations in the Lansing.

Four Strikes Finaled

Kansas operators have completed four new discoveries recently. Petroleum, Inc. opened a new pool in Barton County at 1 Moses, NW NE SW 13-20s-14w, with a pump potential of 35 bbl. of oil per day from the Lansing.

GMR Oil Co. completed a Viola discovery at 1 Bucklin, SE SE NE 6-28s-11w, Pratt County, for 195 bbl. of oil per day. Petroleum, Inc. has another strike in Stafford County at 1 Smith "J," SW NE SE 26-22s-14w, finaled for 301 bbl. of oil per day from the Arbuckle. In Sumner County the 1 Ramp, SW SW SW 1-35s-1e, of Alpine Oil and Royalty Co., was finaled for 334 bbl. of oil per day from the Mississippian.

Pawnee Activity

Natural Gas & Oil Co. and Republic Natural Gas Co. are waiting on cable tools at a new gas discovery well in the southeast corner of Pawnee County.

The 1 Stark, NE NE NW 24-23s-15w, is located about 2½ miles northeast of Hearn pool. The strike gaged 2,640 M.c.f. of gas per day on drill-stem test at 3,897-3,965 ft. in the conglomerate.

Natural Gas & Oil Co. are below 3,838 ft. at 1 Wesley, SW SE SW 11-22s-15w, wildcat 2 miles northeast of Dunes pool and 8 miles southeast of Larned in the east-central part of Pawnee County. Recovery on a drill-stem test in the Lansing at 3,521-54 ft. was 60 ft. slightly oil-cut water and 1,260 ft. water.

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★Heavy steel construction throughout for extra weight. 6"-8"-10" sheaves grooved to any line size.
★2" diameter center pins, Hi-Load roller bearings, Hi-Speed bronze bushings.
★Side plates bolted at three points, minimizes tendency to spread.
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McKISSICK PRODUCTS CORPORATION
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APPALACHIAN AREA

OHIO

A new gas pool has apparently been found by Willard Shrider in Jefferson Township, Coshocton County. The completion on 2 A. J. McConnell, Section 6, topped the Clinton at 3,417 ft. with a gage of 700,000 cu. ft. and was tubed natural at 3,447 ft., still in sand.

A southeast extension to Greer pool was completed by H. E. Perkins on 1 Frank Heaton, Section 5, Richland Township, Holmes County. Lower Clinton at 2,911-2,928 ft. flowed 50 bbl. daily after fracturing.

In the north extension to New Castle pool, Preston Oil Co. 3 H. D. Scott, 2nd Qr., New Castle Township, Coshocton County, made 225 bbl. in 24 hours after fracturing sand found at 3,156-3,190 ft.

WEST VIRGINIA

In Roaring Creek district, Randolph County, West Virginia, Seneca Gas & Oil Co. 2 West Virginia Coal & Coke Corp., wildcat, elevation 2,460 ft., resulted in a dry hole,

Fifth sand 2,178-2,220 ft., show of gas 2,185-2,190 ft., Bayard sand 2,244-2,366 ft., show of gas 2,297-2,308 ft., TD 2,477 ft. Nollem Oil & Gas Corp., has located 4 Goff-Arnold, elevation 2,604 ft., Sago Quadrangle, 2.46 miles south of latitude 38 degrees 55 minutes and 1.80 miles west of longitude 80 degrees 00 minutes. Fox-Trimble 1 J. T. & B. Brennan, reached the Fifth sand at 2,179-2,228 ft., gas at 2,182-2,186 ft., testing 28,000 cu. ft., drilling at 2,283 ft.

CALIFORNIA

Union Completes Gas Test at McKittrick

Union Oil Co. 36-7 Hancock was completed as a new gas discovery in the Belgian anticline area near McKittrick, Kern County. The wildcat rated an initial output of 2,060 M.c.f. through a ½-in. choke, with production coming from 74 ft. of perforations above 1,426 ft.

The new discovery is about 3 miles west of Northwest Belgian Anticline field, in NE SW 7-30s-21e. Production is from the Phacoides sand of Pliocene age. The test is a follow-up to the company's 65X Hancock about ½ mile east, abandoned last summer at 3,880 ft. after all shows proved noncommercial.

Topanga Wildcat Drilling

Atlantic Oil Co. 1 Nettleship, a wildcat staked on the bacterial residue picture, was drilling below 500 ft. in the Topanga Canyon area northwest of Los Angeles. The wildcat's sponsor, Logan Goodknight of Long Beach, has predicted the test will be an oil producer at some depth above 7,000 ft. Site is in SE SE 20-1n-16w, about 11 miles south of the Aliso Canyon oil field.

Castaic Discovery Indicated

A wildcat drilled by Standard Oil Co. of California in the Elizabeth Lake Canyon area of Los Angeles County has indicated it may make a shallow, high-gravity oil discovery. Drilled to 2,172 ft. and plugged back to 1,690 ft., from where a small amount of light oil was swabbed, the wildcat was in process of completion at the first of last week. Location is in SE NE 7-5n-16w, about 4 miles northeast of Castaic.

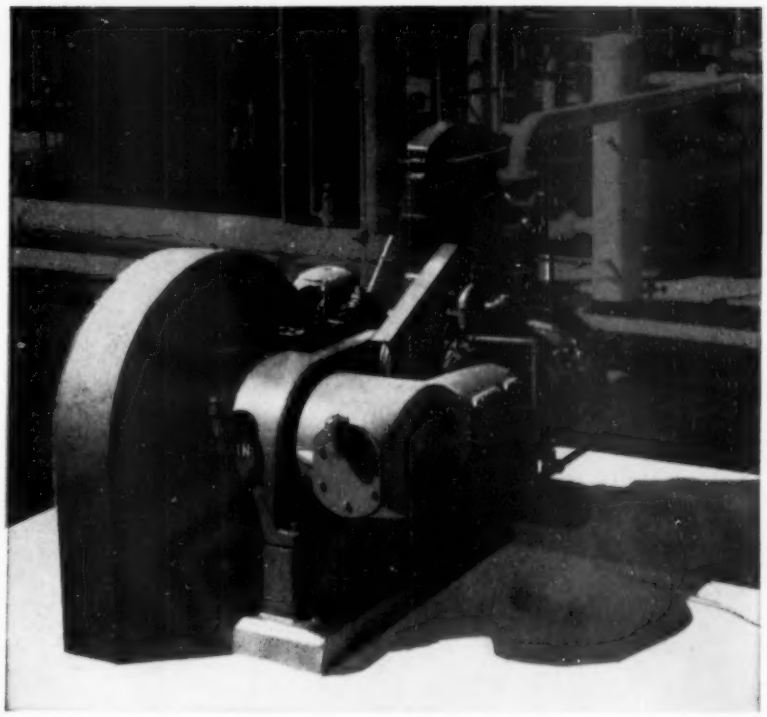
Guijarral Hills Activity

Standard Oil Co. of California 3 33F was under way two locations east of the West Guijarral Hills discovery well completed last October. Stepouts to the south, west, and north of the 8,400-ft. Leda sand discovery all have been failures. Located in SW NW 33-20s-16e, the wildcat is 1½ miles west of the Guijarral Hills field.

In SW SW Sec. 26, about ⅓ mile north of the field, Union Oil Co. 27-26 Spieler was drilling below 9,000 ft. after having indicated it would be a successful extensioner. On a formation test at 8,834-58 ft., the well flowed at a daily rate in excess of 1,000 bbl.

Mountain View Test Planned

General Petroleum Corp. has completed arrangements with M J M & M Oil Co. for a farmout of 160 acres which the latter holds in the Wible area of the Mountain View field near Bakersfield. General Petroleum is contemplating a 10,000-ft. test, or



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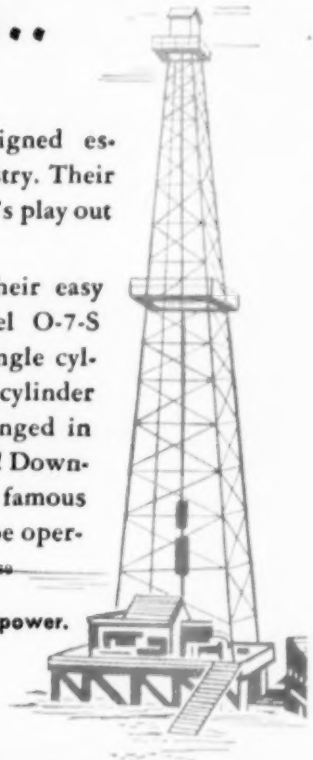

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Models ranging from 10 to 65 horsepower.

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"Whoops! Lane-Wells on the job"

to the Vedder sand, with Union Oil Co., Pacific Western Oil Corp., and Universal Consolidated Oil Co. supporting the play.

LOUISIANA

NORTH LOUISIANA

New Wilcox Discovery On Potential Test

Jett Drilling Co., Inc. 1 Learned, 48-2n-8e, discovery well of Black Hawk field in southern Concordia Parish, flowed 116 bbl. of 46°-gravity oil through 7/64-in. choke in 21 hours on production test from perforations at 8,008½-10½ ft. in the Barksdale sand of the Wilcox.

A 24-hour state potential test is being taken at the new Wilcox discovery, the first for the new year.

SOUTH LOUISIANA

Second Well Completed In Section 28 Deep Pay

New deep-sand production opened last July off the northeast flank of the old Section 28 dome, in St. Martin Parish, has been confirmed in the second test drilled by Kerr-McGee Oil Industries, Inc., which has been completed flowing 200 bbl. of 36.5°-gravity oil per day through 12/64-in. choke.

The newly completed producer, 2 St. Martin Land Co., drilled to 11,597 ft., has casing perforated at 10,998-11,008 ft. The operator's first well, 1 St. Martin Land Co., is perforated at 11,115-25 ft.

New Baton Rouge Field Gets Another Producer

Atlantic Refining Co. has confirmed its last year's Frio-sand oil discovery south of Baton Rouge, in East Baton Rouge Parish, with the completion of its second well, 2 Morgan, flowing 249 bbl. of 48.9°-gravity oil per day through 9/64-in. choke.

Producing interval at 9,932-50 ft. (casing perforations) is approximately 100 ft. higher than in the discovery well, 1-A Morgan, completed last May with potential gage of 189 bbl. of 49.7°-gravity oil per day through 32/64-in. choke.

The second well is one location southwest of the initial producer.

New Acadia Parish Field Produces Gas-Condensate

A new gas-condensate producing area, located 2 miles northwest of Ellis field, southeast of Iota, in Acadia Parish, has been opened by Hassie Hunt Trust. Discovery well, 1 Hayes, in 34-8s-1w, flowed 25 bbl. of 51.5°-gravity condensate with 4,500,000 cu. ft. of gas per day on completion gage through 11/64-in. choke with 5,000-psi. pressure. Production is from sand interval at 11,257-67 ft. in hole drilled to 11,306 ft.

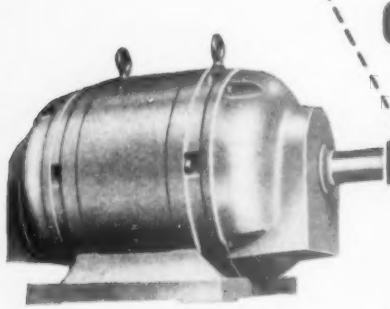
KENTUCKY

EASTERN KENTUCKY

In Magoffin County and in the general Big Sandy gas field area, Kentucky West Virginia Gas Co. has completed another shallow Pennsylvanian producer. At a total

built especially for

OIL COUNTRY REQUIREMENTS



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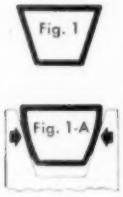
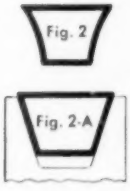
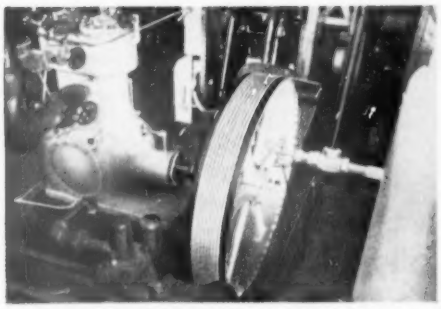


Take any *straight-sided* V-Belt (Fig. 1). Bend it—as it bends in going around a pulley. The sides will at once *bulge out* (Fig. 1-A). Clearly, those bulging sides will press *unevenly* against the V-pulley—and this causes *extra wear* at the points shown by the arrows (Fig. 1-A).

Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2)



Instead of *bulging*, the precisely engineered CONCAVE SIDES merely *fill out* to *fit exactly* in the sheave groove (Fig. 2-A). The sides press *evenly* against the V-pulley. All wear is distributed *uniformly* across the *full width* of the Gates Vulco Rope—and this means *longer* belt life and *lower belt costs* for you!



Typical Gates Vulco Rope Drive—the Gates V-Belts are built with Concave Sides to insure longer belt wear.

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depth of 959 ft. the test gaged natural on open flow at the rate of 536,000 cu. ft. of gas daily from salt sand topped at 884 ft.

MICHIGAN

The prospect of a Dundee dolomite oil discovery in Gilmore Township, Isabella County, appeared favorable at the John Neyer 1 Powell, N½ NE NE 30-16n-5w, as wildcat was being prepared for acid treatment. Dundee top was logged at 3,834 ft., structurally higher than this horizon was found at a series of surrounding control points, and free oil started to show at 3,835-40 ft. Well showed for about a short bailer of free oil an hour on initial tests. Long string of 5-in. casing was set at 3,835 ft. and well was scheduled to be acidized. Operator estimated that the 1 Powell appeared to be good for about 10 to 12 bbl. of oil a day natural. Wildcat is located 4 miles due east of the Coldwater oil pool.

The new Clinton Traverse oil play, Bridgewater Township Washtenaw County, took on boom prospects this week as drilling permits were issued for six area wells. Only one of these was issued to discoverer W. C. Taggart, and this one, the 6 Curtis-Moeller, SE SE SE 29-4s-4e, was in the pay objective, but no good, reliable information had been released. One other of the new starts, issued to McClure Oil Co. & Tom Mask for 1 Allen, NE NE SE 32-4s-4e, had reached 5-in. casing point, 995 ft. at this writing. This test located about ½ mile south of the discovery.

Meanwhile, Taggart 4 Curtis W½ SW SW 28-4s-4e, with good geological information for 4 days through 5-in. casing from its 1,030 ft. shallow pay. Well was tubed early this week and was reported to be flowing at a restricted rate of 14 bbl. of oil an hour. Although Taggart has two other wells into the pay objective, neither has been completely tested.

Pure Oil Co. 1 Gingrich, SE SE SW 30-18n-10w, Richfield sand discovery well in Reed City pool, Osceola County, appeared to have responded satisfactorily to a petrofrac treatment with 3,000 gal. of oil and 3,000 lb. of sand. Well was swabbing and flowing about 70 bbl. of net oil day and is considered a potential 100-bbl. producer.

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MISSISSIPPI

Testing Starts in New Wilcox Discovery Well

Production tests are getting under way at a prospective new Wilcox discovery well drilled by J. Paul Ratliff, Jr., and Petersen Drilling Co. in southwestern Franklin County.

The well, 1 Butler, located in 40-5n-1e, had good oil showings in a sand zone from 6,506 ft. to 6,056 ft., logged in its original hole. In the meantime, a new hole has been drilled from 4,339 ft., sidetracking drill-stem tester and packer stuck in the first hole. Approximately 1,700 ft. of clean oil had been recovered in the test, made at 6,528-37 ft., before the packer stuck.

Bottom of the new hole is 6,605 ft. with oil string cemented at 6,590½ ft. Sand zones in the new hole compared favorably with those in the original hole.

Location of the discovery is southeast of Knoxville townsite, and about 2 miles northwest of North Freewoods field, opened late in 1953 with production from Wilcox sand at 4,574-78 ft.

NEW MEXICO

SOUTHEAST NEW MEXICO

Discoveries Indicated In Two Areas of Eddy County

Deeper drilling in two old producing areas of Eddy County held the spotlight last week. Skelly Oil Co. 6-A Lynch, in the Fren (Seven Rivers and San Andres) area, and Stanolind Oil & Gas Co. 1-AD State, in Red Lake field.

Skelly's test was drilled to total depth of 12,408 ft., then plugged back to 12,006 ft. for testing in the Pennsylvanian. The well kicked off after acid treatment of perforations between 11,962-11,982 ft. On 24-hour test through open tubing the well gaged 190.04 bbl. of 51° oil plus gas at the rate of 4,077,000 cu. ft. daily.

Stanolind 1-AD State in 10-19s-28e, is 4 miles southeast of the company's recent Pennsylvanian gas-distillate discovery. On drill-stem test of the upper Pennsylvanian from 9,515-60 ft. the well flowed an estimated 50-60 bbl. an hour.

Lea County . . . Buffalo Oil Co. 25 Baish, deep wildcat in Maljamar field, found the Wolfcamp water table in another test lower in that formation. Recovery from 9,017-40 ft. was gas and gas-cut mud, 800 ft. of oil cut with salt water, and 1,300 ft. of salt water. Operators drilled ahead below 9,055 ft.

Roosevelt . . . Amerada Petroleum Corp. 1-C Federal, Devonian wildcat in 10-7s-32e, found

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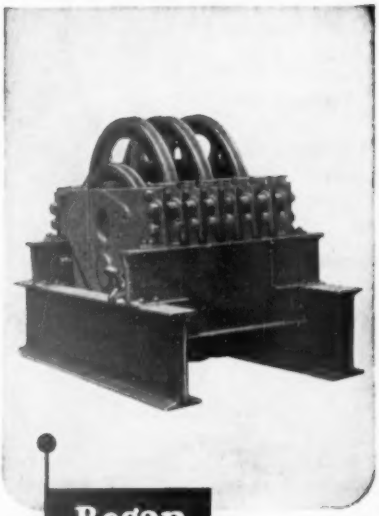

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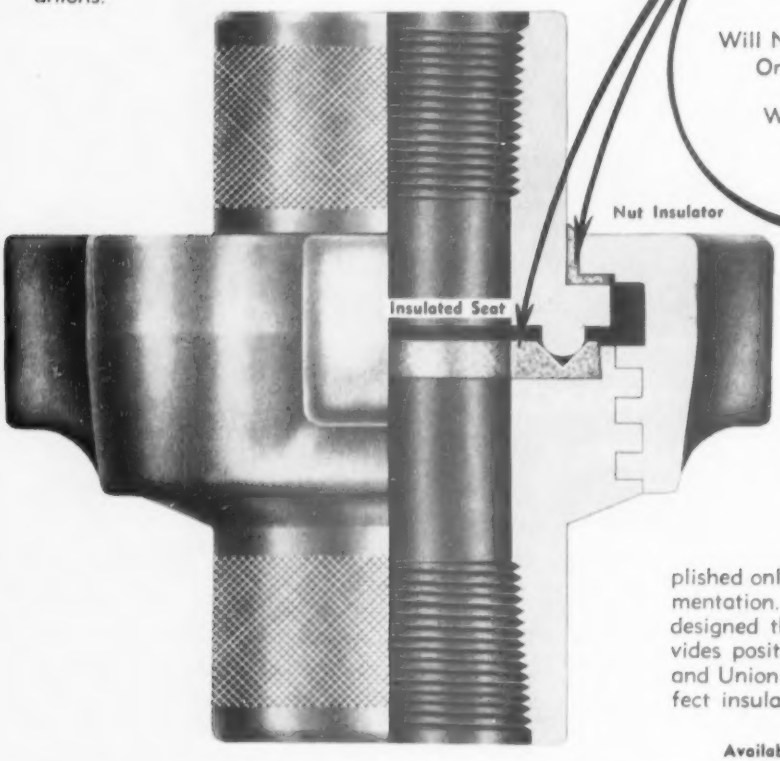

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Lewis Electrical Laboratories tested the Insulated Union with the following results.

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FREQUENCY	INPUT VOLTAGE	LEAKAGE IN MILLIAMPERES
D.C.	1	Not Readable
D.C.	12	.0005
D.C.	115	.004
A.C. 60 Cy.	1	Not Readable
A.C. 60 Cy.	5	Not Readable
A.C. 60 Cy.	125	.012
A.C. 60 Cy.	1000	.075
A.C. 60 Cy.	3000	.5

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slight shows of gas and distillate on a drill-stem test in basal Pennsylvanian sand at 8,875-8,976 ft. Gas surfaced in 9 minutes and maximum volume was at the rate of 184,000 cu. ft. daily. Recovery in 4 hours was 300 ft. of heavily gas and lightly distillate-cut drilling mud. Operators were drilling ahead below 9,000 ft. in Mississippian limestone. Sample top on that formation was 8,942 ft.

WILDCAT COMPLETIONS

SOUTHWEST TEXAS

Atascosa County: Anderson-Prichard Oil Corp. and Humble Oil & Refining Co. 1 Douglas et al, J. Potevent Sur. 3, A-696. Dry. TD 5,687 ft.

Stanolind Oil & Gas Co. 1 Jung, Luciano Balverdo Sur. 365, A-65. IPP 14.04 BOPD, 17°, open hole °5,681-5,737 ft. TD 5,737 ft.

Brooks County: Humble Oil & Refining Co. 5-G Mestena, Tract 3, W. W. Jones Sur. Dry. TD 8,560 ft.

Monterey Exploration Co. 1 Hinojosa, Tract 7, El Tule Grant, A-257. Dry. TD 6,857 ft.

Caldwell County: Rock Hill Oil Co. 1 Hay, J. B. Klecamp Sur. Dry. TD 2,825 ft.

Gonzales County: Rodney DeLange and O. Neathery, Jr., 1 Walters, Mary Ann Williams Sur., A-82. Dry. TD 6,009 ft.

Hidalgo County: Union Producing Co. 1 Montgomery, Blk. R, Santa Cruz Ranch Subd. Unit 3, J. J. Balli Sur., A-290. IP 9,000 M.c.f. daily, open flow, with 57.6° condensate (no gage), casing perforations 8,793-8,814 ft. TD 10,015 ft. New field—San Carlos.)

Jim Hogg County: Sam Cunningham and Rodney DeLange 2-B Silver Lakes Ranches, Inc., Sec. 14, Fowler & Rankin Subd., El Sordo Sur. Dry. TD 4,313 ft.

Medina County: Coates, Palmer & Schimmel 1 Garnand, Thomas Thomas Sur. 516. Dry. TD 1,871 ft.

Nueces County: James M. Anderson 1 Sassman, Sec. 66, George H. Paul Subd. Dry. TD 8,517 ft.

Southwestern Oil & Refining Co. 1 Busenlehner, Sec. 6, Blk. 2, Nueces River Irrigation Park Subd. Dry. TD 9,000 ft.

San Patricio County: Southern Minerals Corp. 1 Gillespie, Sec. 21, George H. Paul Subd., Coleman-Fulton Pasture. Dry. TD 9,048 ft.

Spartan Drilling Co. 1 Hughes, Lot 4, Cubage & Miller Subd., Juan Hart & Sons Sur., A-10. IP 125,000 M.c.f. daily, open flow, casing perforations 6,864-74 ft. TD 7,800 ft. (New field—Angelita.)

Starr County: Sun Oil Co. and George H. Coates 3-C Ramierez, Share 3, Las Comita Grant. Dry. TD 4,952 ft.

Travis County: Reussir Oil Corp. 1 Alexander, Jose Antonio Navarro Sur. Shut down. TD 1,330 ft.

Webb County: Humble Oil & Refining Co. 5 Nicholson, J. Barnes Sur. 2045. Dry. TD 8,002 ft.

Killam & Hurd 1 Bruni estate, C&M Sur. 451. Dry 8D 3,142 ft.

Zapata County: Robert K. Franklin 1 Gutierrez, Share 2, Porcion 23. Dry. TD 2,721 ft.

TEXAS GULF COAST

Austin County: Holmes Drilling Co. and C. W. Van Wormer 1 Goebel, Miles N. Allen Sur., A-2. Dry. TD 11,013 ft.

Brazoria County: Sohio Petroleum Co. et al 1 South Texas Water Co., Lot 17, Kanawa-Texas Co. Subd., W.D.C. Hall Sur., A-69. Dry. TD 7,765 ft.

Chambers County: San Juan Exploration Co. 1 Middleton et al, R. E. Booth Sur., A-34. Dry. TD 8,501 ft.

Colorado County: Magnolia Petroleum Co. 1 Turner, SA&MG Sur. 11, A-879. IP 3,200 M.c.f. daily, open flow, casing perforations 8,883-91 ft. TD 9,219 ft. (New pay in Mustang Creek field.)

Fort Bend County: Edwin L. Cox 1 Miller, William Pettus Sur., A-68. Dry. TD 8,475 ft.

Hardin County: J. P. Owen 1 Gore, James Rafferty Sur., A-45. IP 55.50 BOPD, ¼-in., 40°, first Cockfield sand 6,402-36 ft. (casing perforations), and 149 BOPD, 10/64-in., 39.7°, second Cockfield sand 6,532-35 ft. (Casing perforations.) TD 7,597 ft. (New field.)

Harris County: Malcolm C. Damuth and W. Stewart Boyle 1 Ross Vogt Knigge unit, Blk. 2, James Miller Sur., A-50. Dry. TD 6,250 ft.

Russell Maguire 1 Arnold, David Harris Sur. Dry. TD 8,877 ft.

Russell Maguire 1 Hornberger, W. M. Wilson Sur., A-834. Dry. TD 9,494 ft.

Russell Maguire 1 Scanlan, Victor Blanco Sur., A-2. IP Shut-in gas well (no gage), TD 9,028 ft. (Extends Alco-Mag area.)

Simonton & Talley 1 Crane, Ambrose Mays Sur., A-543. Dry. TD 7,665 ft.

So Relle & So Relle 1 Smith, George Delesdenier Sur., A-229. Dry. TD 7,491 ft.

C. B. Wrightsman and P. R. Rutherford 1 Oates, Edwin Stimpson Sur., A-702. Dry. TD 9,021 ft.

C. B. Wrightsman and P. R. Rutherford 1 Trahan, E. P. Ruhl Sur., A-657. Dry. TD 8,810 ft.

Jackson County: Magnolia Petroleum Co. 1 Flourney, Jose San Pierre Lge., A-68. Dry. TD 4,814 ft.

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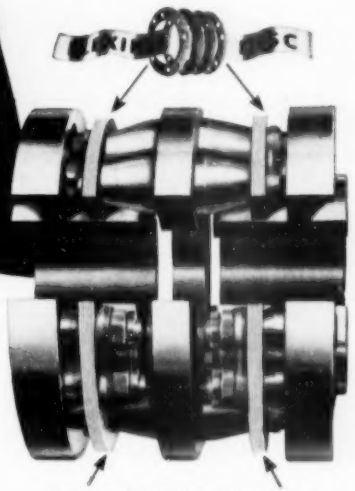

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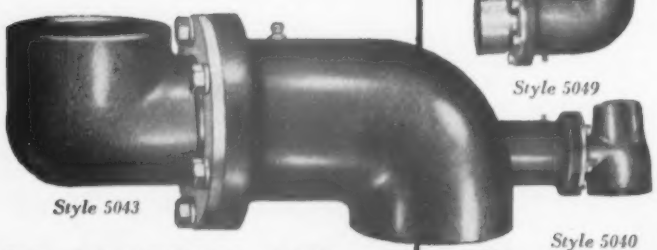
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

BARCO

SWING JOINTS



Style 5043

FOR LOADING AND UNLOADING LINES

BARCO'S new, attractively priced, all-steel ball bearing *Swing Joints* are designed specifically for refinery *service* on loading or unloading lines handling gasoline, oil, lube oil, LP gas, petro-chemicals, and other fluids.

MANY STYLES—The Barco line is complete with single swing, double swing, and counterbalance styles to meet every need! Sizes 2", 2½", 3", 4".

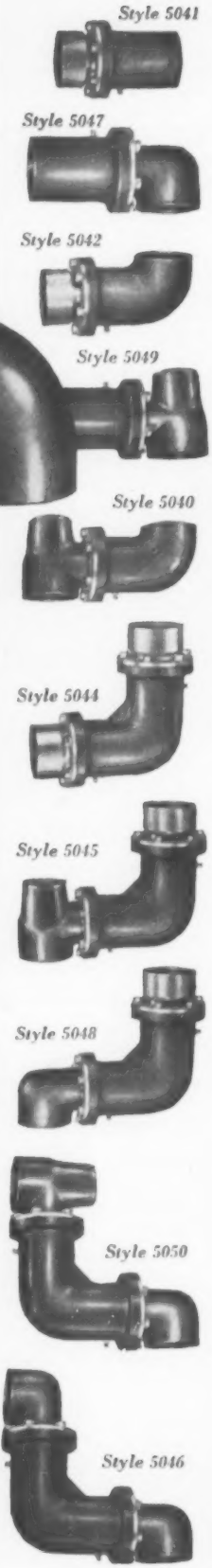
BALL BEARING AND O-RING EQUIPPED—In Barco Swing Joints, the ball bearings do not fall out when joints are taken apart! Long bearing provides adequate pipe support. *Special O-ring seal eliminates frequent gasket replacement and insures leakproof service* over wide temperature range, −40° F. to +225° F.

SIMPLE CONSTRUCTION—Joints can be disassembled for inspection without disconnecting piping. O-rings are easily renewable in the field.

ENGINEERING RECOMMENDATION—Barco will be glad to give you detailed recommendations on joints to use and suggested arrangements for complete loading and unloading assemblies.

Send for a copy of new Catalog No. 400 containing complete information on Barco Swing Joints. BARCO MANUFACTURING CO., 539B Hough St., Barrington, Ill.
(A Chicago Suburb)

BARCO—The Only Truly Complete Line of Flexible Ball, Swivel, Swing, and Revolving Joints



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PETROLEUM DISTRIBUTING COMPANY

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Quality Oil Field Lubricating Oils and Greases

WILDCAT COMPLETIONS

Magnolia Petroleum Co. 1 Vaughn, John Alley Sur., A-3. IP 21,000 M.c.f. daily, open flow, casing perforations 1,539-47 ft. (Frio). TD 4,711 ft. (New field.)

Resaca Oil Co. 1 Carstens, William Menefee Sur., A-53. Dry. TD 3,522 ft.

Karnes County: Blair-Vreeland 1 Manka, A. Hernandez Sur., A-4. Dry. TD 4,048 ft.

Tyler County: Shelly Oil Co. 1 Kirby Tract 165-A, F. Helfenstein Sur., A-352. IP 23,000 M.c.f. daily, open flow, Wilcox 9,598-9,608 ft. (casing perforations). TD 10,502 ft. (New field—Pavey.)

Victoria County: Deep Rock Oil Corp. 1-A Mernitz, Thomas H. Bell Sur., A-129. Dry. TD 8,605 ft.

Reynolds Mining Corp. 1 McCan, C. O. Edwards Sur., A-526. Dry. TD 6,016 ft.

EAST TEXAS

Cass County: Arkansas Fuel Oil Co. 1 Duncan, John A. Nall Sur., A-797. Dry. TD 7,695 ft.

Ellis County: Jess Hickey Oil Corp. 1 Medford, I. Carroll Sur. Dry. TD 1,704 ft.

Panola County: Pure Oil Co. 1 Sholar, W. G. Parrish Sur. Dry. TD 6,267 ft.

Titus County: John B. Stephens, Jr. 1 Avery, Kendall Lewis Sur., A-334. Dry. TD 7,923 ft.

WEST CENTRAL TEXAS

Callahan County: Johnson & Warren 1-B Brown, M. M. Potter Sur. 253. Dry. TD 1,610 ft.

Johnson & Warren 1 Edwards, Sec. 18, BBB&C Sur. Dry. TD 1,505 ft.

C. W. Trammell 1 Jackson, 96-12 T&P. Dry. TD 3,210 ft.

Coleman County: Ab-Tex Drilling Co. 1 Joyce, James Greenwood Sur. 304. Dry. TD 3,745 ft.

Brannon & Murray 1 Roberts, Sec. 29, BBB&C Sur. IP 14.8 BOPD, 34-in., 41°, Gardner sand 3,125 ft. TD 3,216 ft.

Buffalo Oil Co. 1 Earl Davis, Sec. 14, SPRR Sur. Dry. TD 4,015 ft.

Fisher County: Buffalo Oil 1 Brown, Lot 58, Gillespie CSL Sur. 318. Dry. TD 4,092 ft.

Norando Oil Corp. et al 1 Mattie Key, 2-2-H&TC. Dry. TD 5,800 ft. Elev. 2,042 ft., Strawn 5,488 ft.

West Central Drilling Co. et al 1 Patterson, Blk. 7, Lge. 313, Bastrop CSL. Dry. TD 6,484 ft.

Jones County: William Crawford 1 Boyd, M. Fragosa Sur. 267. Dry. TD 3,100 ft.

E. L. Wilson 1 Murfee, Blk. 11, M. W. Dikes Sur. 218. Dry. TD 3,510 ft.

Palo Pinto County: H. L. Ratliff 1 Canty estate, 19-2-T&P. Dry. TD 3,881 ft.

Shackelford County: Woodson Oil Co. 1 Morris Cottle, Sec. 24, BAL Sur. IPP 119 BOPD, 41°, Ellenburger 4,275-85 ft. TD 4,311 ft.

Stephens County: G. W. Ewing 1 Henry Compton, Sec. 30, OAL Sur. Dry. TD 4,270 ft.

Stonewall County: Sojourner Drilling Co. 1 Patterson, 331-D-H&TC. Dry. TD 6,332 ft.

Taylor County: P. G. Lake, Inc. 2 Brown, Jose M. Saucedo Sur. Dry. TD 2,270 ft.

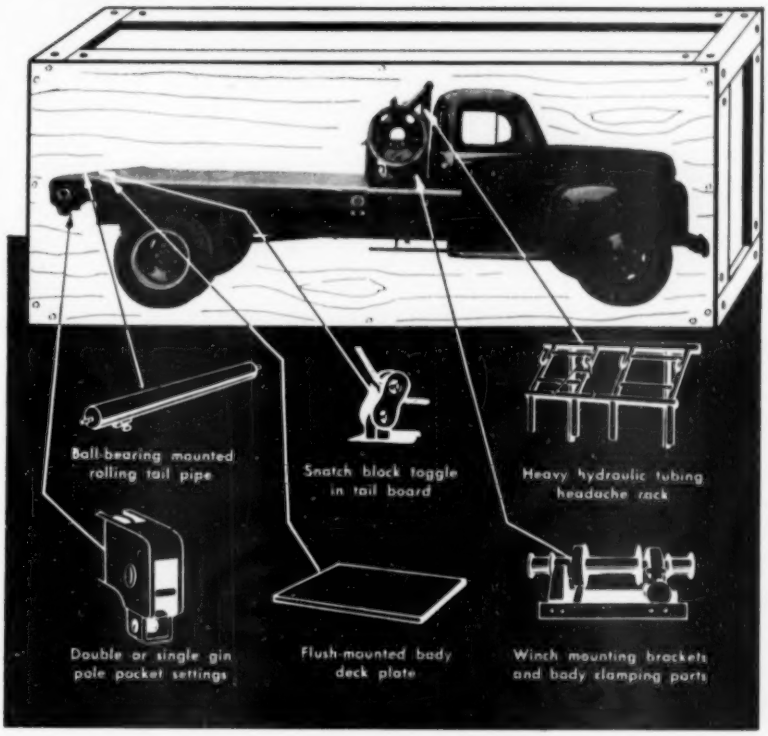
French M. Robertson 1 Griffin, Hood CSL Sur. 94. IP 321 BOPD, 34/64-in., 46°, Gray sand 3,878 ft. TD 3,894 ft.

Throckmorton County: Ada Oil Co. 1 Nettie List, Sec. 2318, TE&L Sur. IP 177 BOPD, 34-in., 41°, lower Caddo pay 4,356 ft. TD 4,375 ft.

NORTH TEXAS

Archer County: Bridwell Oil Co. 1 Cowan,

The LELAND packaged unit


Ball-bearing mounted rolling tail pipe
Snatch block toggle in tail board
Heavy hydraulic tubing headache rack
Double or single gin pole pocket settings
Flush-mounted body deck plate
Winch mounting brackets and body clamping parts

make your own comparison

Packaged for performance . . . packaged for service . . . packaged for long life, trouble-free operation. The LELAND PACKAGED UNIT, combining two tough pieces of equipment — the Leland Oil Field Truck Body and the heavy duty Tulsa Winch. Throughout the petroleum and pipeline industries the Leland Packaged Unit has been found to be the most versatile piece of truck equipment in the field today. Any job . . . all jobs . . . a real work horse which performs efficiently and safely, reducing equipment down-time, stepping up personnel safety.

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EQUIPMENT COMPANY
Oklahoma City • TULSA • Longview, Texas

WILDCAT COMPLETIONS

J. W. Snell Sur., A-386. Dry. TD 3,925 ft.

Frank Wood Associates 1 Schenk, Lot 3, Blk. 3, Clark & Plumb. Dry. TD 4,685 ft.

Baylor County: Y B Drilling Co. 5-B Burrell Mills, TE&L Sur. 2413, A-464. IPP 55.6 BOPD, 38°, pay 1,370 ft. TD 1,372 ft.

Clay County: Ada Oil Co. 1 Baldwin, L. N. Sparks Sur., A-399. Dry. TD 4,700 ft.

Warren Petroleum Corp. 2 Bowen, TE&L Sur. 2640, A-499. Dry. TD 4,045 ft.

Foard County: Graham Drilling Co. 1 Ward, 13-A1-GC&SF, 2 miles N Thalia. IPP 6 BOPD, 38°, pay 2,066 ft. TD 2,106 ft.

Jack County: Paul Bilbrey and W. Albritton 2-A Singleton, Blk. 4, M. Rockerfellow Sur., A-484. IPP 5 BOPD, pay 792 ft. TD 796 ft.

Star Oil Co. 1 Covington heirs, E. Jackson Sur., A-1544. Dry. TD 3,804 ft.

Knox County: The Texas Co. 1 Hamilton, NCT-1, 5-13-H&TC. Dry. TD 6,138 ft.

R. J. Watson 2 Ross Bates, 3-2-D&W Sur. Dry. TD 1,682 ft.

Montague County: W. B. Omohundro 1 Fenoglio, Sec. 7, MEP&P Sur., A-520. Dry. TD 6,618 ft.

Young County: J. Earle Gray 1 Wilson, Blk. 77, TE&L Sur. Dry. TD 1,119 ft.

WEST TEXAS

Andrews County: Hamman Oil & Gas Co. 4-A-1 University, 7-14-University Lands. Dry. TD 4,478 ft.

Hamman 4-B-1 University, 7-14-University Lands. Dry. TD 170 ft.

Borden County: F. Kirk Johnson 1 Owens, 12-33-T3N-T&P. Dry. TD 8,584 ft. Elev. 2,655 ft., reef 8,546 ft.

The Texas Co. 1 Patterson, 520-97-H&TC. Dry. TD 8,366 ft. Elev. 2,696 ft., Ellenburger 8,366 ft.

Coke County: Hancock Oil Co. 1 Baumgart, Tyler Tap Sur. 1. Dry. TD 5,813 ft., Ellenburger 5,642 ft.

M. C. M. Oil Co. 1 Johnson, 393-1A-H&TC. Dry. TD 5,662 ft.

Shamrock Oil & Gas Co. 3 Wendland, Sec. 454, F. Merkel Sur., A-517. IPP 104 BOPD, 39°, Cisco pay 3,652 ft. TD 3,659 ft.

Crockett County: John I. & P. D. Moore 1-R Shannon, 23-YZ-EL&RR Sur. Dry. TD 7,841 ft. Elev. 2,557 ft., Strawn 6,829 ft., Ellenburger 7,510 ft.

Dawson County: Joseph I. O'Neill, Jr. 1 White, 46-34-T5N-T&P. Dry. TD 7,323 ft. Elev. 2,913 ft., Spraberry 6,690 ft.

Sinclair Oil & Gas Co. 1 Weaver, Sec. 7, D. L. Cunningham Sur. 3. Dry. TD 10,500 ft.

Garza County: E. P. Cesinger 1 McCrary, 79-5-GH&H. IPH 12 BOPD, 26°, pay 2,742 ft. TD 2,827 ft.

Hockley County: Bankline Oil Co. and Midwest Oil Corp. 2-1 Mallet Ranch, Lab. 2, Lge. 34, Concho CSL Sur. IPP 47 BOPD, 27°, pay 7,424-7,524 ft. TD 10,544 ft.

Howard County: Hanco Oil & Gas Co. 1 Buchanan, 10-31-T2N-T&P. Dry. TD 7,665 ft. Elev. 2,626 ft., reef 7,639 ft.

Kent County: Lewis T. Lohman 1 Emery Trust, 8-1-H&GN. Dry. TD 7,216 ft. Elev. 2,089 ft., Pennsylvanian 6,693 ft., Mississippian 7,168 ft.

Lamb County: The Texas Co. 1-62 Sallie Duggan, Lab. 18, Lge. 660, State Capitol Lands Sur., in City Park of Littlefield. Second well. IPP 20 BOPD, 74 bbl. water, pay 3,996 ft. TD 4,035 ft.

Mitchell County: Great Western Drilling Co. 1 Baumann, 62-25-T&P. Dry. TD 7,850 ft. Elev. 2,262 ft., Ellenburger 7,238 ft., pre-Cambrian 7,840 ft.

Pecos County: Hunt Oil Co. 47 Elsinore Royalty Co., 21-B-GC&SF. Dry. TD 2,000 ft.

Tiger Minerals, Inc. 1 Anderson, 2-225-GC&SF. Dry. TD 3,364 ft.

Runnels County: Andrew M. Howsley 1 Jones, 79-63-HT&B. IP 28 BO in 8 hours, 15/64-in., pay 2,836 ft. TD 2,842 ft.

J. W. King Jr. 1 Evans, J. S. Wreen Sur. 276. Dry. TD 5,255 ft. Elev. 1,839 ft., Ellenburger 5,238 ft.

Scurry County: Taylor Oil & Gas Co. 1 Winston Bros., 12-1-J. P. Smith Sur. Dry. TD 7,537 ft. Elev. 2,425 ft., Strawn 7,520 ft.

SOUTHEAST NEW MEXICO

DeBaca County: Sid Katz 1 Mabel Field, 13-1n-22e. Dry. TD 5,581 ft. Elev. 4,587 ft., San Andres 560 ft., Glorietta 1,180 ft., Granite wash 3,830 ft., Pennsylvanian 4,430 ft., pre-Cambrian granite 5,390 ft.

Lea County: Ashmun & Hilliard 1 Brazos Unit, 5-14s-32e. Dry. TD 10,027 ft. Elev. 4,368 ft., Wolfcamp 8,750 ft.

Signal Oil & Gas Co. 1 Baker-Federal, 19-26s-29e. Dry. TD 2,716 ft.

Vickers Petroleum Co. 1-D State, 15-16s-32e. Dry. TD 112 ft.

ILLINOIS

Bond County: Hoiles Petroleum Co. 1 Mahan, NE SE NW 22-5n-3w. Dry. TD 1,086 ft.

Clinton County: Frederick Construction Co. 1 Saunders, SW NW SE 15-3n-2w. Dry. TD 1,317 ft.

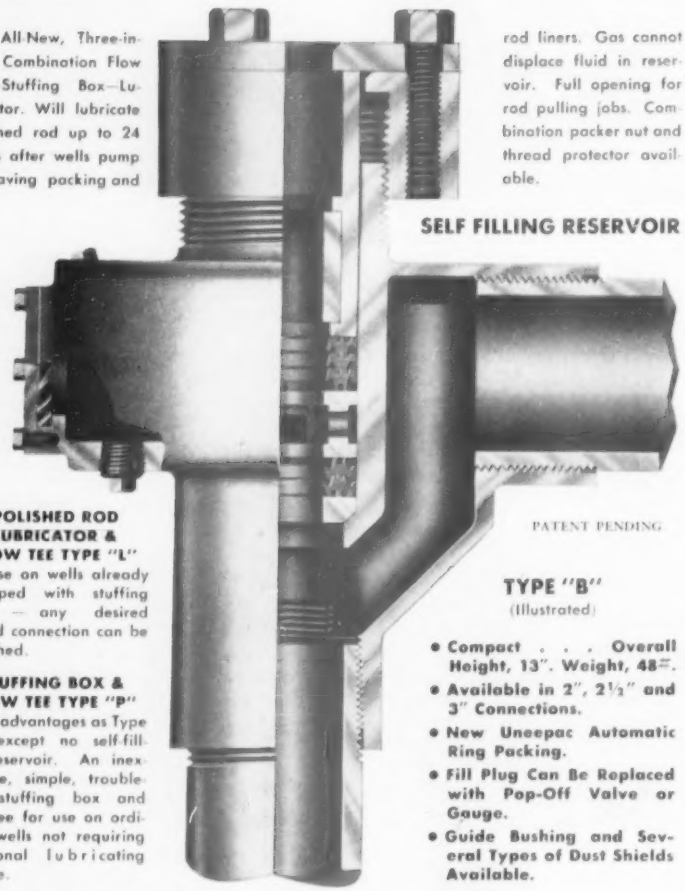
Schiermann-Imming 1-D Reighert-Steiline, SW SW NE 14-1n-4w. Dry. TD 2,530 ft.

Crawford County: Sam Ball 1 Berkshire, SE NE SW 4-5n-12w. Dry. TD 1,647 ft.

MIW

POLISHED ROD LUBRICATOR AND STUFFING BOX TYPE "B"

The All-New, Three-in-One Combination Flow Tee—Stuffing Box—Lubricator. Will lubricate polished rod up to 24 hours after wells pump off, saving packing and rod liners. Gas cannot displace fluid in reservoir. Full opening for rod pulling jobs. Combination packer nut and thread protector available.



SELF FILLING RESERVOIR

PATENT PENDING

POLISHED ROD LUBRICATOR & FLOW TEE TYPE "L"
For use on wells already equipped with stuffing boxes — any desired thread connection can be furnished.

STUFFING BOX & FLOW TEE TYPE "P"
Same advantages as Type "B" except no self-filling reservoir. An inexpensive, simple, trouble-free stuffing box and flow tee for use on ordinary wells not requiring additional lubricating feature.

TYPE "B"
(Illustrated)

- **Compact . . . Overall Height, 13". Weight, 48#.**
- **Available in 2", 2½" and 3" Connections.**
- **New Uneepac Automatic Ring Packing.**
- **Fill Plug Can Be Replaced with Pop-Off Valve or Gauge.**
- **Guide Bushing and Several Types of Dust Shields Available.**

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MUSKOGEE IRON WORKS, INC.
MUSKOGEE, OKLAHOMA

WILDCAT COMPLETIONS

Fayette County: K & H Drilling Co. 2 Kirchner, NW NE NW 19-6n-3e. Dry. TD 1,637 ft.

Franklin County: Bayer Petroleum Co. 1 Hinman, SE SE SW 18-5s-4e. Dry. TD 2,529 ft.

Lawrence County: T. G. Glass 1 King, NE NW NW 16-2n-12w. Dry. TD 2,342 ft.

Montgomery County: Calvert Drilling Co. 1 Webb, NE NW SE 9-7n-2w. Dry. TD 3,306 ft.

Perry County: Ted Glass 1 Malinski, NE NW SE 24-4s-2w. Dry. TD 1,159 ft.

White County: Herndon Drilling Co. 1 McCullough, NE SW NW 22-3s-8e. Dry. TD 3,473 ft.

Herndon Drilling 1 Johnson, SE NW NW 27-3s-8e. Dry. TD 3,358 ft.

TENNESSEE

Fentress County, Wold River: Ed Morris 1 Patton, SW SE SW 9-A 55E. Dry. TD 215 ft.

Lake County, Ridgeley: Frazier & Bens 1-A Hays, C NW SW 18-3s-1e. Dry. TD 2,265 ft.

Frazier & Benz 1-B Hays, C NW SW 18-3s-1e. Dry. TD 2,263 ft.

OHIO

Coshocton County: Willard Shrider et al 2 A. J. McConnell, Sec. 6, Jefferson Township. IP 700 M.c.f. daily, Clinton 3,417-3,447 ft. TD 3,447 ft. (Extends New Castle pool.)

MICHIGAN

Kent County: Tri-County Development Co. 1 Green, NW SE SW 22-10n-12w. Dry. TD 2,367 ft. in Traverse lime.

Manistee County: Associated Drillers & Producers, Inc. 1 Anderson, SE SW SE 34-24n-15w. Dry. TD 1,932 ft. in Dundee and Reed City zone.

Mecosta County: Walter E. Anderson 1 Farwell & Loyd, SW NW NW 36-15n-7w. Dry. TD 3,913 ft. in Dundee and Reed City zone.

Oakland County: Sun Oil Co. 1 Wilson, NE SW SW 25-2n-7e. Dry. TD 4,080 ft. in basal Salina-Niagaran.

Oceana County: Admiral Oil Corp. & McClure Oil Co. 1 Blohm, NE SW NE 14-14n-18w. Dry. TD 1,763 ft. in Traverse lime.

Frank M. Burke, Jr. 1 Schmeiding, NE SW NW 17-14n-16w. Dry. TD 2,018 ft. in Traverse lime.

Roscommon County: Lakeland Oil oCrp. 1 State-Richfield, SW SW SW 1-22n-1w. Dry. TD 2,856 ft. in Traverse lime.

Van Buren County: Harris Oil Co. 1 Mallek, SW SE SW 27-3s-14w. Dry. TD 1,088 ft. in Traverse lime.

Norman L. Stevens 1 Haynes, NW NW SW 11-4s-13w. Dry. TD 1,229 ft. in Traverse lime.

WEST VIRGINIA

Randolph County, Roaring Creek district: Seneca Gas & Oil Co. 2 West Va. Coal & Coke Corp., elevation 2,460 ft. Dry. Fifth sand 2,178-2,220 ft., show gas 2,185-2,190 ft., Bayard sand 2,244-2,366 ft., show gas 2,297-2,308 ft., TD 2,477 ft.

FLORIDA

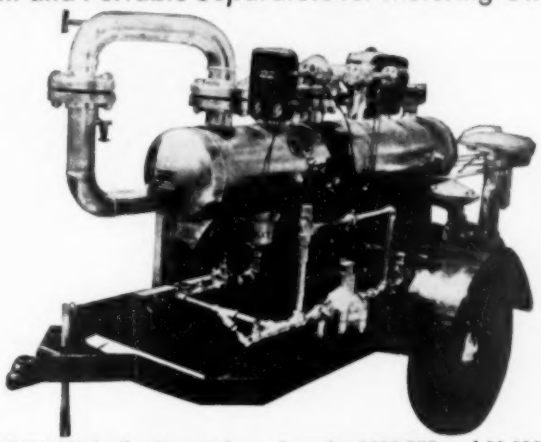
Jackson County: Sun Oil Co. 2 McRae, 9-6n-11w. Dry. TD 3,817 ft. Elev. 134 ft., lower Cretaceous 3,550 ft.

GEORGIA

Liberty County: E. B. LaRue et al 1 Jelks-Rogers, unsurveyed. Dry. TD 4,264 ft.

ROLO WELLCHECKERS

Permanent and Portable Separators for Metering Oil and Gas



Rolo No. 12 H-1607 Trailer Mounted. Capacity 1000 BPD and 11,500 MCF gas.
Rolo Wellchecker No. 12 H-1607 has vessel 16" x 7' x 1200# w.p. code labeled, with 4" gas run, manual by-pass, automatic water knockout, special sample cocks and thermometer wells. Oil, gas and water are removed in separate lines, metered, and then recombined, if desired.
Made in all sizes to fit any operation, Rolo Wellcheckers are shipped with all controls, piping and accessories ready to operate. Rolo Wellcheckers enable the operator to check production daily and to secure accurate records for royalties and taxes. See Composite Catalog or write for illustrated bulletin.

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ROLO MANUFACTURING COMPANY

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The Model 16-LH Non-Fouling Cathead

THE OUTSTANDING CATHEAD OF TODAY AND TOMORROW

- Anti-Fouling Catline Spool
- Completely Housed Friction Cathead
- Simplicity of Design, Operation and Maintenance
- Double-Plate Clutch
- Anti-Friction Bearings Throughout as Recommended by Leading Bearing Manufacturers
- Choice of Mechanical, Hydraulic or Air Controls

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TULSA, OKLAHOMA

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TUBING TONGS • SAFETY "C" POLISHED ROD CLAMPS

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Proved long life and stubborn resistance to corrosion make cast iron pipe a contributing factor in lowering plant maintenance per barrel of crude. Replacing shorter-lived pipe with cast iron pipe has demonstrated this in many refineries. Cost per term of service decreases. Interference with production, caused by frequent replacements, ceases to be a headache. Cast iron pipe works hand-in-glove with plant management to keep maintenance cost down in many refinery operations. Available with bell-and-spigot, plain end and flanged, or with standardized mechanical joints. Cast Iron Pipe Research Association, Thomas F. Wolfe, Engineer, 1015 Peoples Gas Bldg., Chicago 3, Illinois.

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FOR LONG LIFE AND ECONOMY

A JENSEN In the Field Means Money IN Your Pocket!

The day you equip your well with a JENSEN Pumping Unit you can start putting more money IN your pocket.

JENSEN Units cost less to buy . . . less to operate . . . less to maintain . . . and they just can't be beat for dependability. All this results in lower costs and greater profits for YOU.

Get the proof in the field—standardize on JENSEN Pumping Units!

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Elev. 26 ft., Cretaceous 2,300 ft., Eutaw 3,476 ft., lower Tuscaloosa 4,022 ft., Granite 5,250 ft.

ALABAMA

Coffee County: Robert W. Williams 1 Prestwood, C NW SE 8-7n-22e. Dry. TD 3,160 ft. Elev. 360 ft., Eutaw 1,905 ft.

Geneva County: Lyle Cashion Co. et al 1-A Yawley et al, C NW SW 16-1n-21e. Dry. TD 4,216 ft. Elev. 187 ft., marine Tuscaloosa 3,520 ft.

MISSISSIPPI

Adams County: Humble Oil & Refining Co. 3-B Breaux et al, 12-4n-4w. Dry. TD 7,318 ft. Elev. 64 ft., Wilcox 4,916 ft., Parker zone 6,879 ft.

SOUTH LOUISIANA

Cameron Parish: Royalite Oil Co., Inc., et al 1 State Lease 2352, 14-16s-3w. Shut down. TD 14,040 ft.

Iberville Parish: A. C. Glassell, Jr. 1 Slack Brothers, 10-7s-10e. Dry. TD 9,920 ft.

Plaquemines Parish: California Co. 1 State Lease 2410, Blk. 24, Main Pass area. IP 265 BOPD, 9/64-in., 37°, casing perforations 5,856-88 ft. TD 9,693 ft. (New field.)

St. Bernard Parish: Phillips Petroleum Co. 1 State Lease 2220, Blk. 48, Eloi Bay, Chandeleur Sound area. IP 190 BOPD, 7/64-in., 37°, casing perforations 5,856-88 ft. TD 9,693 ft. (New field.)

The Texas Co. 1 State Lease 2307, Township 14-19e, in Chandeleur Sound. Dry. TD 10,000 ft.

St. Charles Parish: W. T. Burton 1 Dufrene, 11-15s-20e. IP 70 BCPD and 3,250 M.c.f. daily, 12/64-in., 54°, casing perforations 11,354-64 ft. TD 12,244 ft. (New pay in Bayou Des Allemands field.)

St. Martin Parish: Forest Oil Corp. 1 Colais, 60-8s-6e. Dry. TD 1,798 ft.

Terrebonne Parish: The Texas Co. 121 State-Caillou Island, Township 23s-20e, in Timbalier Bay. IP shut-in gas well, no gage, casing perforations 13,064-82 ft. and 13,816-31 ft. TD 16,000 ft. (New pay in Caillou Island field.)

West Baton Rouge Parish: Humble Oil & Refining Co. 1 Carruth, 64-7s-12e. Dry. TD 9,507 ft.

NORTH LOUISIANA

Caldwell Parish: George C. McGhee and C. N. Valerius 1 Urania Lumber Co., 8-11n-2e. Dry. TD 3,645 ft.

ARKANSAS

Union County: Caddo Oil Co., Inc. 1 Pickering, C SE NW NE 1-17s-16w. Dry. TD 2,153 ft.

White County: Robert A. Voigt et al 1 Shafer, 13-6n-5w. Dry. TD 1,067 ft.

G. B. Butterfield 1 Smith, C SW NE 25-6n-6w. Dry. TD 905 ft.

OKLAHOMA

Alfalfa County: L. J. Horwitz 1 Kephart-Waggoner, NE NE SW 21-25n-11w. Dry. TD 6,067 ft.

Caddo County: Shell Oil Co. 1-53 Pois-Biszy (Strat test), SW SW SE SW 31-6n-11w. Dry. TD 7,949 ft.

Cleveland County: Ohio Oil Co.-Skelly Oil Co. 1 Little Fish unit, NE SW SW 25-9n-1e. Dry. TD 6,505 ft.

Mid-Continent Petroleum Corp. 1 Fulkerson, SW SE NE 35-9n-1w. Dry. TD 7,671 ft.

Garvin County: Stanolind 1 House "B," SE SE SE 2-1n-3w. IPF 390 BOPD, 10,964-966 ft., 37°, 14/64-in. TD 11,026 ft. (Oil discovery.)

Jackson County: Woodson Producing Co. 1 Wallace, C SE SW 9-2n-20w. Dry. TD 2,753 ft.

Kay County: Guido Pigott 1 Nutter, SE SE NW 32-29n-1w. Dry. TD 3,610 ft.

Kiowa County: Stanolind Oil & Gas Co. 1 State, SW SE SW 24-6n-17w. Dry. TD 3,071 ft.

Childress Drilling Co. 1 Hobbs, NW NE NE 34-7n-18w. Dry. TD 1,500 ft.

Lincoln County: Nadel & Gussman 1 Reed, SE SE SW 14-13n-4e. Dry. TD 4,471 ft.

Gulf Oil Corp. 1 Cowden, NW SW NE 29-12n-4e. Dry. TD 5,589 ft.

C. A. Yoakum 1 Powers, SW NE SE 19-15n-5e. Dry. TD 3,550 ft.

K&H Drilling Co. 1 Biswell, SE SW SW 11-16n-5e. IPF 51 BOPD, Prue sand 3,300-14 ft., 2,000 M.c.f. of gas per day, 41°, 16/64-in. TD 3,690 ft. (Oil discovery.)

Foster Drilling Co. 1 Tressie, NE NW SW 33-16n-5e. Dry. TD 3,681 ft.

Osage County: Gross Producing Co. 1 Osage, NW NW SW 2-23n-6e. Dry. TD 2,951 ft.

Royal Oil & Gas Co. 1 Osage, SW SW SW 23-26n-4e. Dry. TD 3,384 ft.

Pawnee County: Bond Oil Corp. 1 Waters, NE SE SE 3-21n-5e. Dry. TD 3,103 ft.

Payne County: McElroy Ranch Co. 1 Masheter, NW NE NE 2-18n-3e. Dry. TD 4,383 ft.

Texas Pacific Coal & Oil Co. 1 Story, SE NW NW 1-17n-3e. IPF 36 BOPD, Skinner sand 3,642-64 ft., 27°, 22/64-in. TD 4,460 ft. (Oil discovery.)

Virgil Ball 1 Berry, NE NE NE 33-19n-2e. Dry. TD 4,669 ft.

Seminole County: Myer Moren 1 McIntosh-Palmer, SW SW SW 29-11n-7e. Dry. TD 4,100 ft.

Stephens County: Mack Oil Co. 1 Beard,

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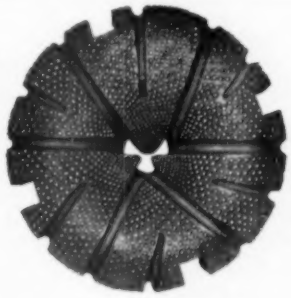

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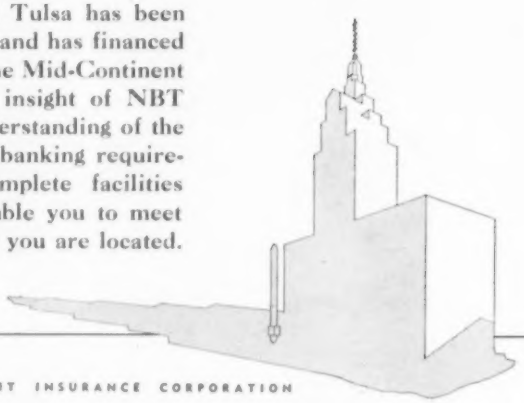

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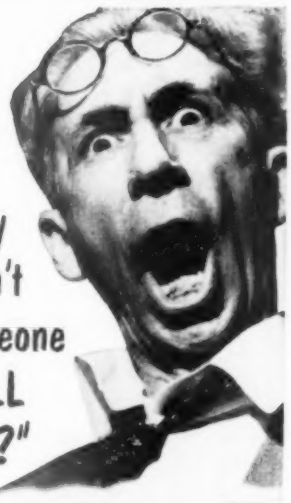

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WILDCAT COMPLETIONS

NE NE NW 36-1n-6w. Dry. TD 2,621 ft.
Mack 1 Wright, NW NW SE 16-2n-5w. Dry. TD 7,016 ft.

KANSAS

Barber County: Coppinger 1 McClain, NW NE NE 30-30s-14w. Dry. TD 4,625 ft.

Barton County: Lauck 1 Demel, SW SE NW 26-17s-13w. Dry. TD 3,440 ft.
Herndon Drilling Co. 1 Hulme, SW SW NW 21-20s-12w. Dry. TD 3,513 ft.

Butler County: GMR 1 Planters State Bank, NW NW SW 1-26s-6e. Dry. TD 2,810 ft.
Kewanee Oil Co. 1 Ferry, NE NE SW 12-26s-7e. Dry. TD 2,818 ft.
White & Ellis 1 Stewart, SW SW SW 36-28s-4e. Dry. TD 2,869 ft.

Cowley County: Eckland Drilling Co. 1 Cross, NE NE NW 23-33s-5e. Dry. TD 3,040 ft.

Decatur County: W. W. Sauvage 1 Larson, NE NE SE 7-3s-29w. Dry. TD 4,380 ft.
Alden E. Branine 1 Addelman, NE NE SE 28-5s-30w. Dry. TD 4,195 ft.

Dickinson County: Ingling & Providence 1 Miller, SE SE SE 29-14s-1e. Dry. TD 3,323 ft.

Ellis County: United Drilling Co. 1 Befort, NW NW SW 23-14s-20w. Dry. TD 3,798 ft.

Graham County: Hall, Jones, Berwick 1 Abernathy, NW NW SE 8-7s-25w. Dry. TD 4,230 ft.
Midstates Oil 1 Newell, SW NE SE 21-8s-21w. Dry. TD 3,690 ft.
Jones, Shelburne & Farmer 1 Deines-Holland, SE SE NW 25-8s-22w. Dry. TD 3,740 ft.

Harper County: Morrison Drilling Co. 1 Sanders, SE SE NW 14-32s-7w. Dry. TD 4,768 ft.

Hodgeman County: M. B. Armer 1 Smalley "B," SW SW NW 9-23s-24w. Dry. TD 4,765 ft.

Kingman County: Earl Wakefield 1 Snyder, NE NE NE 5-30s-5w. Dry. TD 4,750 ft.

Kiowa County: Sun Oil Co. 1 Ross, SW SW NW 14-28s-17w. Dry. TD 5,102 ft.

Lyon County: John Pfau 1 Baker, SW NW SW 34-20s-13e. Dry. TD 1,761 ft.

Marion County: Anderson-Prichard Oil Corp. 1 Scully "B," NE NE SW 2-18s-2e. Dry. TD 3,152 ft.

Marshall County: Fred Noren et al 1 Holle, SE NE NW 13-2s-6e. Dry. TD 1,931 ft.

McPherson County: Carey 1 Lundquist, NW NW NE 5-17s-4w. Dry. TD 3,895 ft.

Norton County: Jones, Shelburne & Farmer 1 Coleman, NW NW NE 5-3s-23w. Dry. TD 3,655 ft.
Russ Shields 1 Mizell, SW SW NE 10-3s-25w. Dry. TD 3,902 ft.

Rooks County: Petroleum, Inc. 1 Stanner "A," NW NW SE 21-8s-17w. Dry. TD 3,530 ft.

Rush County: Victor Drilling Co. 1 Crotinger, SW SW NE 12-18s-17w. Dry. TD 3,558 ft.
Barbara Oil Co. 1 Schraeder, SW SW SW 18-19s-17w. Dry. TD 3,954 ft.

Russell County: Ash-Mar Drilling Co. 1 Schmeidler, NE NE SW 22-12s-15w. Dry. TD 3,277 ft.

Seward County: Vickers Exploration, Ltd., 1 Alexander, C SW NE 14-33s-32w. Dry. TD 6,106 ft. Chester 5,824 ft.
Columbian Fuel Corp. 1 Rinehart, C NE SE 10-33s-31w. IP 2,322 M.c.f. of gas per day, Morrow 5,584-88 ft. TD 6,040 ft.

Stafford County: Petroleum, Inc. 1 Hamilton "C," SW SW NE 2-22s-11w. Dry. TD 3,552 ft.
C.R.A. and Hawley 1 Allen, SW SW NE 30-23s-11w. Dry. TD 3,838 ft.

(Continued on page 455)

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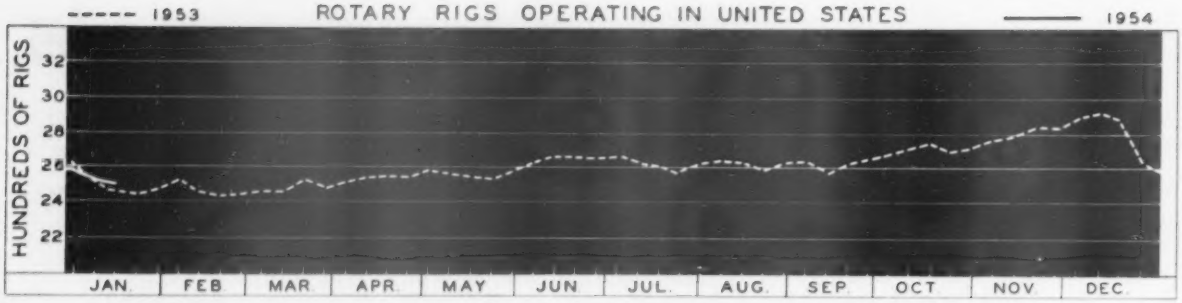
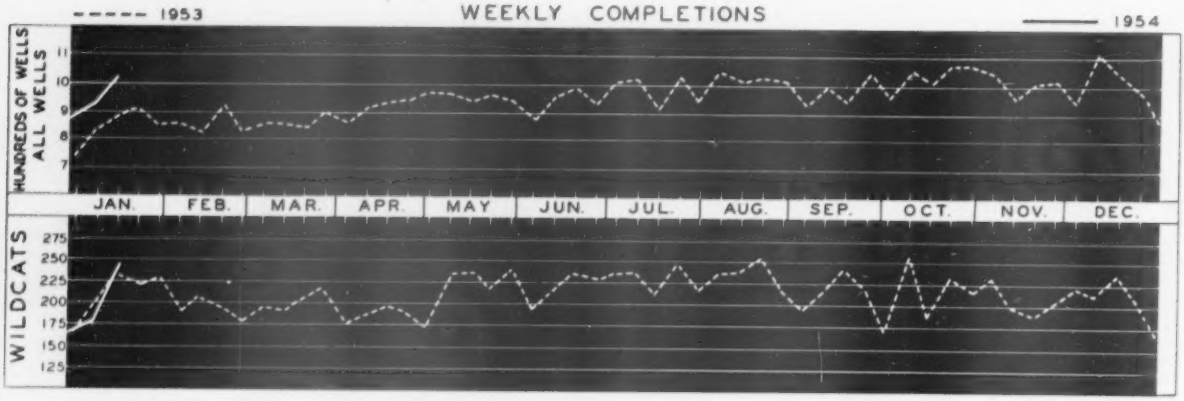




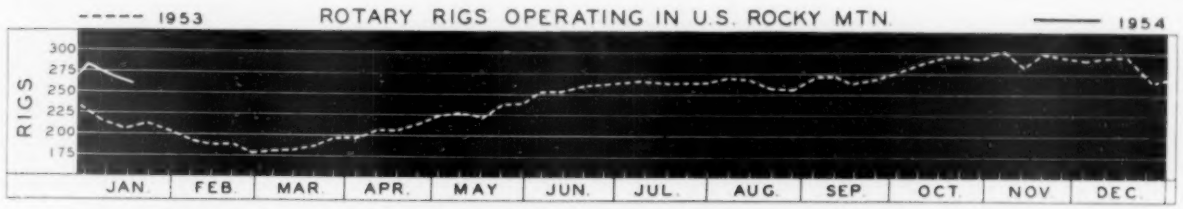
CURRENT STATISTICS

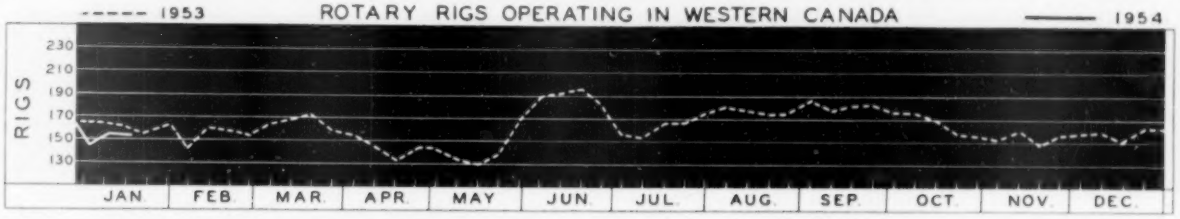
EXPLORATION

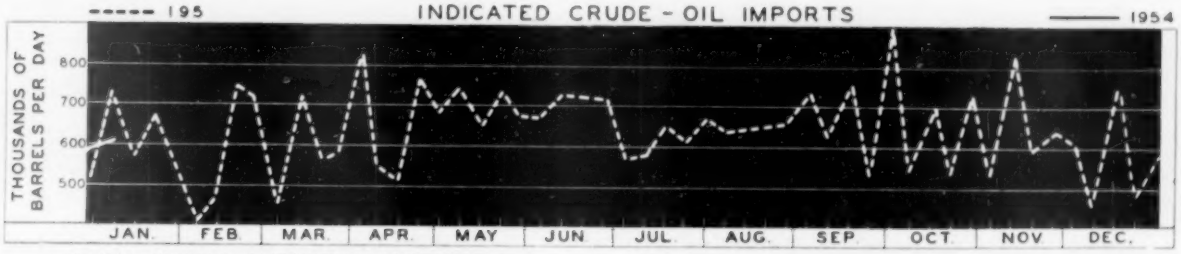
WEEKLY WELL COMPLETIONS . . . WEEK ENDED JANUARY 16, 1954

	Total of all wells					Jan. 16		Wildcat completions and discoveries													
													Cumulative total, 1954								
	Comp.	Oil	Gas	Dry	Footage	1954	1953	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
Pennsylvania-New York	53	26	5	*22	108,928	121	105	0	0	0	0	0	0	0	1	2	3
West Virginia	9	1	4	4	21,280	17	15	0	0	0	1	1	0	0	1	1	2
Ohio	25	11	3	†11	56,893	46	34	0	0	1	0	1	0	0	2	0	2
Indiana	0	0	0	0	0	37	70	0	0	0	0	0	0	0	0	4	4
Kentucky	8	0	8	0	20,346	42	67	0	0	0	0	0	0	0	0	4	4
Illinois	74	44	0	30	196,799	141	114	0	0	0	11	11	0	0	0	22	22
Michigan	16	6	0	10	36,159	33	33	0	0	0	9	9	1	0	1	15	17
Kansas	107	36	8	‡63	370,804	172	169	0	0	1	33	34	0	0	1	36	37
Nebraska	9	5	0	4	48,759	20	11	2	0	0	4	6	2	0	0	6	8
Oklahoma	166	91	6	69	568,269	380	266	3	0	0	20	23	6	0	0	32	38
Texas	315	170	11	134	1,547,574	664	598	15	2	4	73	94	27	3	5	154	189
North Central (Dist. 7-B & 9)	99	51	0	48	320,470	242	185	8	0	0	22	30	16	0	0	65	81
West (Dist. 7-C & 8)	94	67	0	27	506,950	174	125	5	0	0	16	21	7	0	0	30	37
Panhandle (Dist. 10)	0	0	0	0	0	29	22	0	0	0	0	0	0	0	0	0	0
Eastern (Dist. 5 & 6)	8	1	1	6	48,222	26	22	0	0	0	4	4	0	0	1	6	7
Gulf Coast (Dist. 2 & 3)	61	28	3	30	400,699	117	114	1	1	3	16	21	3	2	3	32	40
Southwest (Dist. 1 & 4)	53	23	7	23	271,233	76	130	1	1	1	15	18	1	1	1	21	24
Louisiana	85	56	9	20	521,473	178	144	2	1	1	6	10	4	3	2	14	23
Northern	44	31	7	6	97,751	104	74	0	0	0	1	1	1	0	0	5	6
Southern	41	25	2	14	423,722	74	70	2	1	1	5	9	3	3	2	9	17
Arkansas	13	8	0	5	34,059	44	19	0	0	0	3	3	4	0	0	5	9
Mississippi	5	3	1	1	33,989	16	20	0	0	0	1	1	0	0	0	6	6
Southeastern States	4	0	0	4	15,457	5	5	0	0	0	4	4	0	0	0	4	4
Montana	9	4	0	5	26,380	20	19	0	0	0	3	3	0	0	0	6	6
Wyoming	19	9	0	10	79,198	45	26	1	0	0	4	5	2	0	0	12	14
Colorado	24	3	0	21	130,702	48	28	0	0	0	16	16	1	0	0	30	31
Utah	8	1	3	4	43,981	8	6	0	0	0	3	3	0	0	0	3	3
New Mexico	26	18	4	4	192,974	40	62	0	0	0	4	4	0	0	0	5	5
California	45	31	2	12	225,961	106	99	1	0	1	11	13	4	0	2	25	31
North Dakota	5	4	0	1	43,559	15	10	0	0	0	1	1	1	0	0	5	6
Miscellaneous (S. D., Tenn.)	4	0	0	4	6,345	4	0	0	0	0	4	4	0	0	0	4	4
Total United States	1,029	527	64	438	4,329,889	2,205	1,920	24	3	8	211	246	52	6	15	395	468
Total previous week	934	516	67	351	3,639,670			20	3	4	153	180	28	3	7	184	222
Total January 17, 1953	896	437	59	400	3,761,793			31	2	9	188	230	64	6	16	410	496

Service wells included: *17, †3, ‡1.





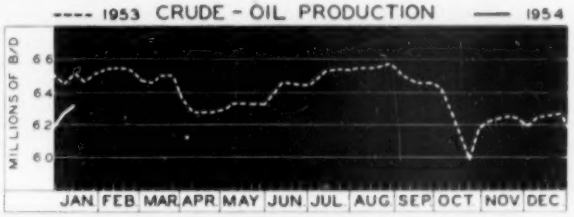


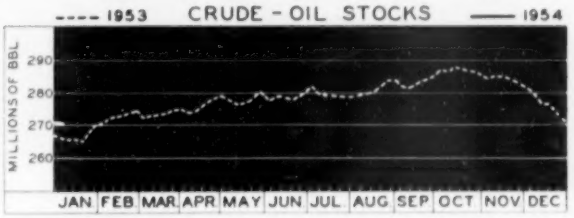
DAILY AVERAGE PRODUCTION FOR WEEK

	January 16 Crude oil	Lease condensate	Total	Jan. 9 total
Alabama	4,300		4,300	4,400
Arkansas	75,750	650	76,400	75,450
California	1,008,500		1,008,500	1,011,600
Colorado	105,200		105,200	108,100
Eastern	59,000		59,000	59,400
Florida	1,475		1,475	1,475
Illinois	169,200		169,200	172,300
Indiana	32,700		32,700	32,400
Kansas	335,200		335,200	274,800
Kentucky	32,300		32,300	32,100
Louisiana	634,550	44,100	678,650	678,450
North	105,000	3,600	108,600	108,400
South	529,550	40,500	570,050	570,050
Michigan	33,400		33,400	33,800
Mississippi	89,700	3,600	93,300	93,000
Montana	35,100		35,100	34,200
Nebraska	18,900		18,900	18,200
New Mexico	198,725	900	199,625	199,825
Oklahoma	526,500		526,500	528,600
Texas	2,618,200	49,150	2,667,350	2,667,350
Dist. 1	39,500	450	39,950	39,950
Dist. 2	134,800	6,325	141,125	141,125
Dist. 3	417,300	23,750	441,050	441,050
Dist. 4	241,000	6,100	247,100	247,100
Dist. 5	44,900	450	45,350	45,350
Dist. 6	112,700	5,400	118,100	118,100
East Texas field	231,000		231,000	231,000
Dist. 7-B	121,400	50	121,450	121,450
Dist. 7-C	173,500	4,625	178,125	178,125
Dist. 8	839,000	1,500	840,500	840,500
Dist. 9	184,600	450	185,050	185,050
Dist. 10	78,500	50	78,550	78,550
Utah	4,700		4,700	4,600
Wyoming	239,800		239,800	243,600
North Dakota	14,100		14,100	14,200
Total U. S	6,237,300	98,400	6,335,700	6,287,850
Change from previous week, up			47,850	
Canada	219,500		219,500	219,500

Total U. S. production January 1-January 16 100,760,650 bbl.
Same period last year (crude plus cond.) *104,823,650 bbl.

*Includes 1,413,925 bbl. condensate.



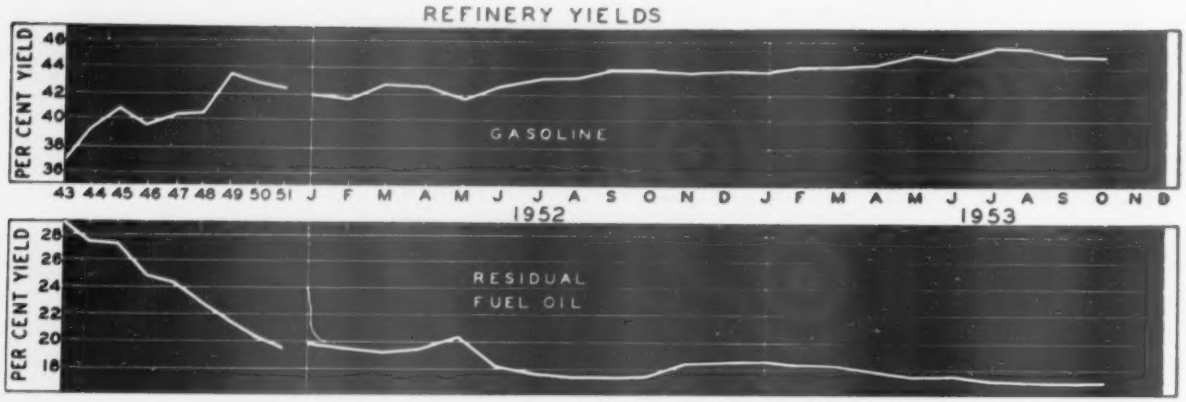


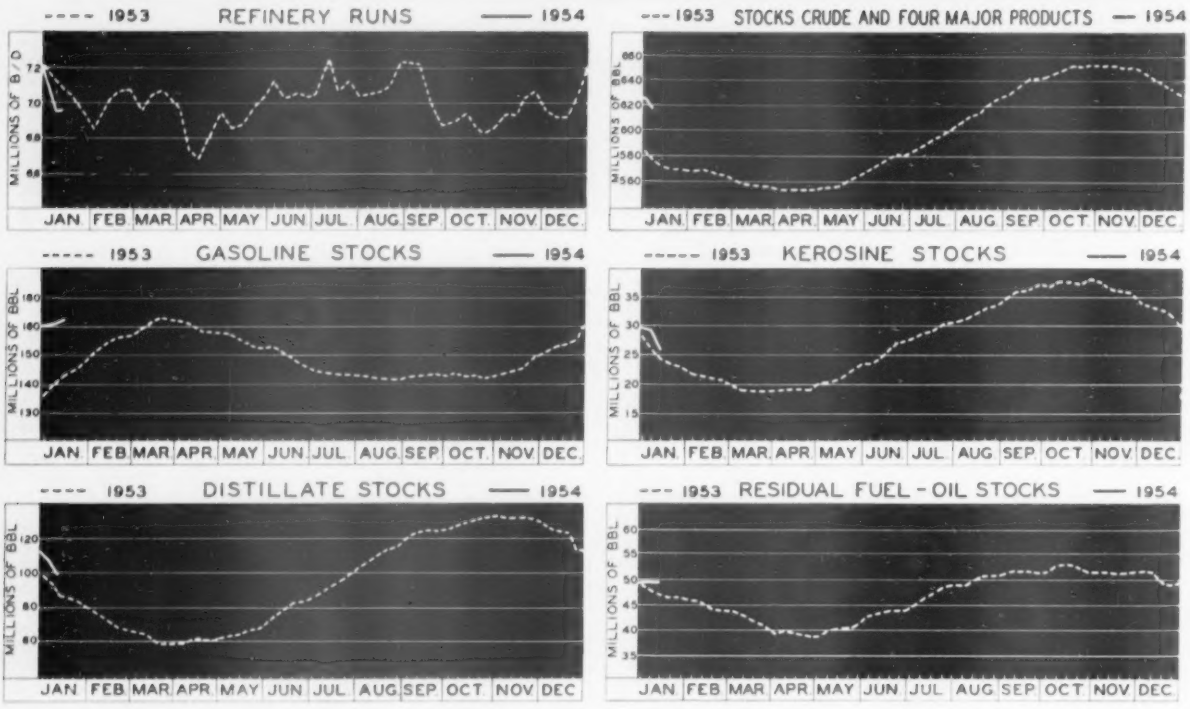
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

	Jan. 9, '54	Jan. 2, '54	Jan. 10, '53
Pennsylvania Grade	2,521	2,676	2,265
Other Appalachian	1,713	1,513	1,823
Illinois, Indiana, Michigan	11,598	12,144	10,818
Arkansas	3,379	3,309	3,332
Louisiana	16,141	15,919	15,440
North	2,834	2,563	2,523
Gulf	13,307	13,356	12,917
Mississippi	3,471	3,305	3,143
New Mexico	9,276	9,214	7,374
Oklahoma and Kansas	34,624	34,503	34,847
Texas	127,343	127,241	134,040
East Texas	11,228	11,571	11,023
West Texas	54,884	54,392	61,899
Texas Gulf	26,281	26,464	26,444
Other Texas	34,950	34,814	34,674
Rocky Mountain	16,601	16,632	14,631
California	33,488	34,048	31,731
Foreign	†10,423	10,265	8,434
Total	270,578	270,769	267,878

*Bureau of Mines. †Includes 3,336,000 bbl. in California.


REFINERY YIELDS
PER CENT YIELD
GASOLINE
43 44 45 46 47 48 49 50 51 J F M A M J J A S O N D J F M A M J J A S O N D
1952
1953
PER CENT YIELD
RESIDUAL FUEL OIL

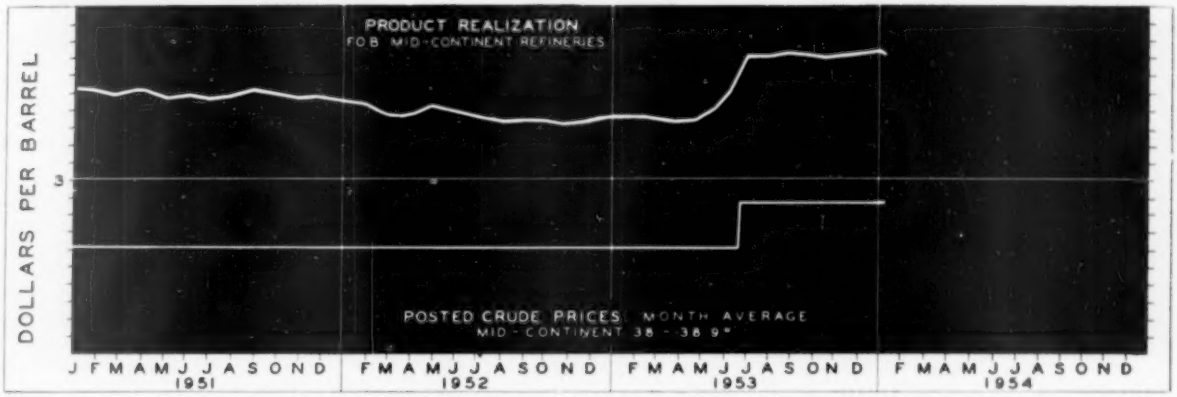

---- 1953 REFINERY RUNS —— 1954
MILLIONS OF B/D
--- 1953 STOCKS CRUDE AND FOUR MAJOR PRODUCTS — 1954
MILLIONS OF BBL
----- 1953 GASOLINE STOCKS —— 1954
MILLIONS OF BBL
----- 1953 KEROSINE STOCKS —— 1954
MILLIONS OF BBL
---- 1953 DISTILLATE STOCKS —— 1954
MILLIONS OF BBL
--- 1953 RESIDUAL FUEL-OIL STOCKS —— 1954
MILLIONS OF BBL
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

A.P.I. REFINERY REPORT, JANUARY 16

(Thousands of barrels)

District—	Daily avg. runs	Daily average production — Gaso.*	Kero.	Dist.	Resid.	Stocks‡ — Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, January 1953 — Daily avg. runs	Daily average production — Gaso.*	Kero.	Dist.	Resid.
East Coast	1,039	418.9	43.0	266.4	261.0	35,316	11,701	37,227	11,289	1,080	452.9	48.5	259.9	260.9
Appalachian:														
District 1	123	51.7	7.1	30.7	14.1	4,430	582	1,441	800	116	48.9	9.3	19.6	19.2
District 2	96	53.1	6.9	17.3	15.0	2,050	515	727	196	92	47.6	7.9	14.3	16.1
Ind., Ill., Ky.	1,296	706.9	89.0	245.3	177.7	34,190	6,548	16,564	4,365	1,324	689.6	104.0	246.0	194.9
Okla., Kans., Mo.	574	358.0	16.3	132.6	45.0	17,718	1,354	9,491	1,097	582	330.9	12.6	141.1	62.4
Inland Texas	227	175.7	8.7	34.4	25.2	6,379	305	1,787	1,332	273	184.4	15.5	41.3	39.4
Texas Gulf Coast	1,633	769.9	140.8	384.9	236.7	23,600	2,305	11,134	6,224	1,742	790.3	155.7	441.4	253.0
La. Gulf Coast	573	289.6	74.8	122.0	54.4	9,995	1,607	5,026	1,632	524	239.5	56.3	130.4	50.9
N. La. and Ark.	90	36.1	8.9	20.0	4.3	3,764	344	1,008	162	286	35.5	8.5	18.3	8.1
Rocky Mountain:														
New Mexico	20	12.9		2.7	2.7	215		63	36	20	12.1	0.7	2.6	4.0
Other Rocky Mtn.	231	120.3	3.7	52.1	41.0	6,482	205	2,311	818	229	117.2	7.1	47.4	43.4
California	1,066	458.8	5.9	166.3	397.6	21,412	407	12,896	21,115	974	435.0	7.2	166.1	354.6
Jan. 16, 1954	6,968	3,451.9	405.1	1,474.7	1,274.7	165,551	25,873	99,675	49,066	7,042	3,383.9	433.3	1,528.4	1,306.9
Jan. 9, 1954	6,960	3,517.1	410.3	1,483.1	1,228.4	162,343	28,588	106,628	49,668					
Jan. 17, 1953	7,081	3,433.9	398.7	1,557.6	1,289.0	143,492	24,932	88,773	47,745					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.


PRODUCT REALIZATION
FOB MID-CONTINENT REFINERIES
DOLLARS PER BARREL
3
POSTED CRUDE PRICES, MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
J F M A M J J A S O N D
1951
F M A M J J A S O N D
1952
F M A M J J A S O N D
1953
F M A M J J A S O N D
1954

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.73 for week ended January 9, $3.77 for previous week, and $3.36 for January 1953. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of January 20, 1954. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	10.875-11.5	12.5-13.5	10.75-11.75
Premium gasoline	11.875-12.5	13.75-14.5	11.75-12.75
42-44 w.w. kerosine	9-9.25	10.7	9.125-9.5
No. 2 straw fuel oil	8.125-8.375	9.7	8.375-8.5
No. 6 residual	$1.50-1.60	$2.25-2.40	$1.85-1.95

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5.5	5.0	5.25
Grade 18-55	6.6	6.10	6.35

LUBRICATING OILS
South Texas

200 vis., No. 2-3 neutral	12.5-13.75
750 vis., No. 3-4 neutral	15.5-16.75
2,000 vis., No. 5-6 neutral	17-18.75

LUBRICATING OILS
Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	19-19.5
200 vis., No. 3 neutral, 0-10 pp.	14.25

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	19.5
180 vis., 10 p.t. neutral	22.5

WAX
Mid-Continent

132-134 A.M.P.	6.0

COLD weather in all of the major burning-oil areas added strength to the kerosine and distillate markets but increased the pressure on gasoline.

By January 18 almost all of the marketers in the New York Harbor area had met the increase of 0.3 cent a gallon for barge deliveries of No. 2 fuel. The increase was announced by Esso Standard Oil Co. on January 13, following closely the withdrawal of a voluntary discount of 0.25 cent on barge deliveries of No. 2.

The increase of 0.3 cent a gallon does not cover reductions that were made earlier in the heating season. At this time last year, No. 2 fuel was available from some suppliers at 9.6 cents in the harbor, but most of the larger suppliers were asking and getting 9.65 cents. Thus, the price after the increase of 0.3 cent is only 0.05 cent a gallon more than last year, despite the crude-price increase last June. Some suppliers are predicting that heating-oil prices for the area will move up again if the cold weather holds for most of the last of January.

Better markets and higher heating-oil prices on the East Coast were followed by smaller gains on the Gulf Coast. Small gains in a weak market may start near points of consumption, but in the case of a strong market, the higher prices will be more likely to originate on the Gulf Coast.

Heavy movement of kerosine and distillates out of pipe-line terminals in the North Central states is giving a better tone to the Group 3 heating-oil market. Since demurrage will start on February 1 for the heating oils stored in the line last summer, many suppliers are working to sell as much of this material as possible during the cold-weather rush. The Weather Bureau forecasts for the period January 15 to February 15 indicate temperatures well below normal for states in the upper part of District 2.

CRUDE PRICES
GRAVITY SCHEDULE

	Signal Hill, Calif.*	Oklahoma, Kansas	Gulf Coast Tex.†	West Tex.‡
14-14.9	$1.87	....	....	....
15-15.9	1.93	....	....	....
16-16.9	1.99	....	....	....
17-17.9	2.05	....	....	....
18-18.9	2.11	....	....	....
19-19.9	2.18	....	....	....
20-20.9	2.24	$2.50	....	$2.37
21-21.9	2.30	2.52	....	2.39
22-22.9	2.37	2.54	....	2.41
23-23.9	2.45	2.56	....	2.43
24-24.9	2.53	2.58	$2.91	2.45
25-25.9	2.61	2.60	2.93	2.47
26-26.9	2.69	2.62	2.95	2.49
27-27.9	2.76	2.64	2.97	2.51
28-28.9	2.83	2.66	2.99	2.53
29-29.9	2.91	2.68	3.01	2.55
30-30.9	2.97	2.70	3.03	2.57
31-31.9	3.04	2.72	3.05	2.59
32-32.9	3.12	2.74	3.07	2.61
33-33.9	....	2.76	3.09	2.63
34-34.9	....	2.78	3.11	2.65
35-35.9	....	2.80	3.13	2.67
36-36.9	....	2.82	3.15	2.69
37-37.9	....	2.84	3.17	2.71
38-38.9	....	2.86	3.19	2.73
39-39.9	....	2.88	3.21	2.75
40 and above	....	2.90	3.23	2.77

*Standard Oil Co. of California. †Upper Texas Gulf Coast ‡Includes New Mexico Permian.

Prices East of California effective June 15, 1953. California prices effective February 16, 1953. Pennsylvania Grade prices effective January 1, 1954.

FLAT CRUDE PRICES

Representative posted schedules per barrel

Louisiana:	
Cotton Valley (distillate)	$3.00
Cotton Valley (Holloway crude)	2.95
Texas:	
East Texas	2.90
Chapel Hill	2.83
Conroe	3.13
Van	2.73
Pennsylvania Grade:	
Bradford	3.76
Middle District	3.70
Southwest Pennsylvania	3.31
West Virginia	3.25
Ohio	3.24
Illinois Basin	3.02

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Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

UNDISPLAYED CLASSIFIED 20c a word one issue. 10% Discount three or more consecutive issues. $4.00 minimum charge. Blind Box in our care nine words. Payable in Advance.

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$14.00 a column inch one issue . . .
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Address Classified Advertising Material: The Oil and Gas Journal, P. O. Box 1260, Tulsa 1, Okla.

HELP WANTED

CHIEF CHEMIST experienced in Pod column work and gasoline plant process and product control testing to take charge of laboratory located at large gasoline plant in West Texas. Housing furnished and salary to be commensurate with qualifications of applicant. Please furnish experience record and salary expected. Our employees have been notified of this advertisement. Box G-776, The Oil and Gas Journal, Tulsa, Oklahoma.

INDEPENDENT Recycling Plant operating in conjunction with pressure maintenance on 3 reservoirs requires reservoir engineer. Project located in Louisiana. Housing furnished and salary to be commensurate with qualifications of applicant. Box G-849, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Several party chiefs — transit men with pipe location experience. Also one Engineer graduate to head up organization for field surveys. Age 30 to 45. Write Box G-885, The Oil and Gas Journal, Tulsa, Oklahoma.

PROCESS ENGINEER: Young man, under 35, with Degree in Chemical Engineering or Petroleum Engineering (Refinery). Up to 3 years experience in oil refinery process work desirable but not absolutely necessary. Permanent position with a Texas Gulf Coast refinery. Please give complete personal resume. Box G-881, The Oil and Gas Journal, Tulsa, Oklahoma.

SOUTH AMERICA. Major Oil Company. Our fee paid. Mechanical Engineer—Petroleum Engineer—Chemical Engineer—Geologist—All requiring Degree, experienced or inexperienced. Mud Technician — Two or more years' experience, single. Tool Pusher—under 40, three years' experience. Accountant—Degree, Accounting major, single. All information confidential. Contact CHAS. J. LOVELESS PERSONNEL SERVICE, 616 S. Main, Tulsa, Oklahoma. Phone 3-5163.

OFFICE MANAGER

For New York office of oil company with domestic, Canadian and foreign operations. Good salary and opportunities to participate in stock purchases, options and bonuses. Applications will be kept confidential. Write full details of employment record, age and give references in first letter. Address Box 13241, Houston 19, Texas.

INSTRUMENT MECHANIC

Major Oil Company in Venezuela has opening for Instrument Mechanic with minimum of 2 years' experience in repairing and maintaining controls, recorders, and safety shut-down instruments normally used in compressor plants and natural gas absorption plants.

WRITE GIVING FULL DETAILS TO:
P.O. Box No. 35
BOWLING GREEN STATION
New York 4, New York

HELP WANTED

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co. Box 2603, Tulsa, Okla. $5.00 cash.

WANTED: Several supply salesmen with reasonable experience. One Houston and Gulf Coast territory. One general Texas and Oklahoma. Information given will be held in confidence. Box G-860, The Oil and Gas Journal, Tulsa, Oklahoma.

SEISMIC SUPERVISOR required by expanding and aggressive seismic contracting company. Should have ability to supervise any domestic area and have good professional contacts. Minimum requirements: college degree in geophysics or related fields and eight years' seismic experience. Good future. Tulsa location. Box G-705, The Oil and Gas Journal, Tulsa, Oklahoma.

MANUFACTURER'S AGENT to represent manufacturer of oil field drilling equipment in the North Texas and Panhandle area. Box G-882, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Person experienced in the development, improvement and evaluation of petroleum products (not petrochemicals). Southwestern location, small community, integrated oil company of moderate size. Opportunity for advancement and supervisory experience. Box G-888, The Oil and Gas Journal, Tulsa, Oklahoma.

SIDELINE SALESMAN WANTED or Manufacturers representative calling on the oil industry and supply houses to represent large manufacturer of Wiping Rags and Cotton and Wool Waste. We offer a marvelous opportunity to the right man with a following. Must have good following. Top commission paid. State what territory you now cover. Exclusive territorial rights can be arranged. This is a high quality competitive line. Nationally known brand. Give full information first letter. Columbia Wiping Cloth Co., 10th and Hardesty, Kansas City, Mo.

FOR ENGINEERS,
FIELD & OFFICE STAFF
--OILMEN CONSULT—
GOOD EMPLOYMENT AGENCY
Skilled free service by technicians.
1554 California St. AC. 0835
Denver, Colorado (24-hr. service)

CONTACT MEN WANTED

Preferably over 30 years of age for reputable nationally known "mud" logging company. Prior associationships and contacts with production and geological departments important, no sales experience necessary. $1,000 per month salary plus car, expenses, and liberal commission. Openings in Rocky Mountain District covering Billings, Casper, Denver, and Bismarck; West Texas and New Mexico covering Midland, Hobbs, and Roswell; Gulf Coast covering Houston and San Antonio; Mid-Continent covering Tulsa and Oklahoma City, also Fort Worth-Dallas. Our employees know of this ad.

Box G-863
The Oil and Gas Journal
Tulsa, Oklahoma

HELP WANTED

GEOLOGIST: Active Independent Producing Company has opening for Geologist — prefer graduate of Southwestern school—5 to 10 years' experience—subsurface—well sitting—age, 30-40—live in Tulsa —operate in central and eastern Oklahoma. All replies strictly confidential. Box G-883, The Oil and Gas Journal, Tulsa, Oklahoma.

INSTRUMENT MAN NEEDED: Oklahoma refinery has opening for experienced instrument man. Must be able to install and service usual makes and types of refinery recorders and controllers. Normal 40 hour week with extra pay for call outs and overtime. Write giving resume of education, training, and experience. Replies will be held confidential. Box G-884, The Oil and Gas Journal, Tulsa, Oklahoma.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

ASS'T SUPERINTENDENT
Gas Department

Major Oil Company in Venezuela has opening for graduate Engineer with 7-10 years' experience in operational and administrative functions of Gas Department to supervise department construction program and conduct engineering and economic studies.

WRITE FULL DETAILS TO:
P.O. Box No. 35
BOWLING GREEN STATION
New York 4, New York

OIL REFINERY
MAINTENANCE ENGINEER
THE MAN WE WISH TO EMPLOY IS PROBABLY EMPLOYED BY SOME OIL COMPANY

He should be a graduate engineer and trained to supervise oil refinery shut downs, particularly catalytic cracking units. He must have the personality and ability to cope with labor relation problems and negotiations, and enjoy sales contact work with clients and prospective clients. We are only interested in interviewing men that make excellent presentations and have poise in all of the categories mentioned above. We will train the man chosen to our methods, and the position can lead to one of chief engineer or a managership. All replies will be held in strict confidence. We are contractors (headquartered in California) to the petroleum and chemical industries engaged on operations domestic and foreign. Salary commensurate with experience and ability. Kindly forward educational and business background information with photograph to

Box G-892, The Oil and Gas Journal
Tulsa, Oklahoma

HELP WANTED

FOREIGN OIL JOBS. During 1954 an oil company client of ours will need many men experienced in various phases of drilling and production, in his overseas operations. Contact Tom Robinson, owner, Oil Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5974.

GEOLOGISTS

SUBSURFACE

With degree in Geology and a minimum of 3 years' subsurface experience on deep wells. To work in Saudi Arabia on deep wells making lithologic and faunal logs from cores and cuttings, interpreting electrical logs and working on field and regional stratigraphic studies. Salary commensurate with experience and qualifications.

JUNIOR

Recent graduate with B.S. in Geology with knowledge of micropaleontology and subsurface methods. Experience desirable but not essential.

MICROPALEONTOLOGIST

Preferably with an advanced degree and a minimum of 5 years' commercial or academic experience. To work in the New York research laboratory of a major oil company. This position demands broad interests in Stratigraphy and Biofacies and the capacity to do independent work on projects assigned. Salary dependent on experience and qualifications.

Write giving personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR

BOX OGJ

Arabian-American Oil Company

505 Park Avenue

New York 22, N. Y.

Representative for Tool Line

Manufacturer of nationally famous line of Pipe Wrenches, Pipe Cutters and related Tools seeks experienced manufacturer's agent covering wholesale trades. Several choice territories open in expanding national sales organization. These Tools have a fifty year history of acceptance in Plumbing, Hardware, Mill Supply, Railroad and Oil Industries . . . many established wholesale accounts . . . thousands of satisfied users. Write, giving full details of wholesale trade covered, number of men travelled, territory and lines handled. Box G-880, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

INDEPENDENT gas producer needs experienced production superintendent familiar with drilling, completions and producing operations in East Texas and North Louisiana. Replies confidential. Box G-891, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas and New Mexico Personal interview by appointment is desired. Makin Drilling Company, Box No 1628, Ph. No. 3-3141, Hobbs, New Mexico

GEOPHYSICIST, desires position as Seismic Supervisor. Thirteen years experience Education in electronics and geology. Particularly interested in record reinterpretation. Box G-833, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST, Bachelor's degree; 7 years' experience with major and independent oil companies; familiar with Anadarko Basin, West Texas, Southeast New Mexico and San Juan Basin. Married. Box G-877, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Position in purchasing. 27 years in oil refining. Know refining equipment. Box G-856, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: 37, 13 years' major company experience in North and West Texas and New Mexico desires connection with Independent located in Dallas. Best references. Consider part time. Box G-876, The Oil and Gas Journal, Tulsa, Oklahoma.

ACCOUNTANT, oil production and heavy industrial experience. Prefer to remain in Texas. Box G-824, The Oil and Gas Journal, Tulsa, Oklahoma.

PRACTICAL GEOLOGIST, 33, married, 10 years experience surface and subsurface exploration, subsurface development, and reserve estimation, West Texas and New Mexico, desires responsible position with aggressive Oil Company. Box G-858, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: M.S., 2 years' experience mostly in Williston Basin. Preferably in Rocky Mountain area. Box G-861, The Oil and Gas Journal, Tulsa, Oklahoma.

LAND MAN: 25 years' experience in all phases of land work in Mid-Continent, Gulf Coast and Rocky Mountain Areas, with major and independent companies. Good references. Available now. Box G-866, The Oil and Gas Journal, Tulsa, Oklahoma.

PILOT and Petroleum Engineer — Desire combination job in Petroleum Industry. Age 29, licensed commercial Pilot. Employed as Petroleum Engineer with major oil company, 19 months' experience. Box G-873, The Oil and Gas Journal, Tulsa, Oklahoma.

EXECUTIVE PILOT. Degree Geology, current CAA Airline Transport Rating twin Beechcraft and Douglas DC3. 4500 hours. Commercial rating single and multiengine land and sea. Release from Navy January. Desire flying position connection oil operations independent or company. Box G-878, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED oil-legal stenographer & notary with car; available hourly or daily. Miss Major, Houston, Texas, PR 8332, for appointment.

PETROLEUM ENGINEER, six years' varied experience, three years field engineer. Presently employed with major in South Louisiana. Desire aggressive independent or individual. Must offer responsibility and opportunity. Box G-886, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, seven years' experience, wishes affiliation with independent contemplating entry into, or already interested in the Rocky Mountain Area. Box G-896, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST, 33, M.S., 8 years' experience in all phases of exploration and development, exceptional discovery record, presently serving as district geologist for major company in West Texas and New Mexico, desires responsible position in West Texas or Rocky Mountain area. Box G-894, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

CHEMICAL ENGINEER, age 40, fifteen years' experience in the operation and design of Gasoline Plants, Refineries and Petro-Chemical Plants, specialized in the design and operation of high purity ethylene plants. Desires responsible position with a progressive Oil Company. Box G-791, The Oil and Gas Journal, Tulsa, Oklahoma.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column. Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

EXECUTIVE ACCOUNTANT: 12 years' experience, oil producing and pipe line. 8 years contracting and manufacturing. Desires position with aggressive company. Box G-893, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE PETROLEUM ENGINEER: 33, married, 10 years diversified sub-surface geology, drilling, production, surveying, reserves, workovers, and gas engineering experience. Will locate anywhere with opportunity for advancement with major or independent. Now employed. Box G-897, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER, 30, desires to relocate. Broad experience with major company. Background includes process engineering and operating, refinery economics, crude and product quality studies, refinery efficiency surveys. Box G-898, The Oil and Gas Journal, Tulsa, Oklahoma.

LOUISIANA ATTORNEY: Over 10 years experience in general practice primarily in oil and gas law, titles, leases, unitization, etc. Would like to make connection with firm or company. Willing to locate in Louisiana, Texas, Mississippi, or Arkansas. Please reply to Box G-899, The Oil and Gas Journal, Tulsa, Oklahoma.

EQUIPMENT FOR SALE

REFORMING or gas oil thermal Alco cracking furnace, 1500 sq. ft. carbon steel tubes, 1735 sq. ft. 2¼ chrom. .5% moly alloy tubes, good condition. And 1300 ft. 2.0% chrom. 1% moly alloy pipe 8" OD x 6.75 ID. For further information write or wire Purchasing Department, P. O. Box 1117, Shreveport, Louisiana.

JOY 250, tandem trailer mounted with tools and drill pipe, located Tulsa, A-1 condition. Inquiries to Box 6147, Tulsa, Okla.

SALES and rentals of cable drilling and fishing tools, casing and equipment from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

CARDWELL well servicing unit, 6MZ Waukesha engine, Brown Pipe Transmission. Seven inch brake bands. All in good condition. $1500.00. J. A. Finlayson, 108 E. 4th, Ph. 3-3563, Tyler, Texas.

22,000 FEET of 8⅝ inch good, heavy, used line pipe, 40 ft. lengths, $1.25 per foot. See Curtis Chambers, May, Texas.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

USED EXCELLENT CONDITION IN OPERATION

One Each (4¾" to 1") (13⅜" to 4½") LANDIS Leadscrew Receding Head Pipe Threading and Cutting Machine Motor Driven.

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Phone CHarter 6914
P. O. Box 2589 Houston

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

EQUIPMENT FOR SALE

SULLIVAN 200, tandem trailer mounted with tools and drill pipe. A-1 Condition, ready to go. Inquiries and inventory to Box 6147, Tulsa, Okla.

EVERYTHING in new and used equipment for well drilling. Fishing tools rented. Save money, get quotations from Pressey & Son, Pueblo, Colorado.

USED WILSON "Titan" Drawworks with Type DR 40" Hydromatic Brake, Foster Catheads, Compound for three LRO Waukesha Engines; 4" x 50' Chiksan Rotary Hose, 3½" and 4½" IJ Drill Pipe; plus other accessories priced to sell. Jones & Laughlin Steel Corporation, Supply Division, Box 2481, Attention W. R. Clarke, Tulsa, Oklahoma.

POT VALVE 4x6 Wheatley power pump with Buda Engine on skids, complete belts, pulleys and guard. A-1 shape. $850.00. J. A. Finlayson, 108 E. 4th, Tyler, Texas.

40 ea. Cable Tool Stems—4" to 5½" O.D. 20 ea. 5½" x 36' Fishing Jars W. 3¾" Joints. 95 ea. Bailers—4¼" to 10" O.D.—25' to 70' Lengths. 84 Sand Pumps—Spang—Larkin—Miller—All Sizes. Well Servicing Units—All Sizes—Truck Mounted or Skid Units. RL Cardwell Double Drum Spudder—Excellent Condition. General Tool & Supply Co., Box 4387, Oklahoma City, Oklahoma.

REDA PUMP complete w/#4—20 Motor 45½ H.P., 650 Volt, 41.6 Amps. #90—Pump Housing, #5595—Switchboard w/recording Ammeter 3400'—#4 Cable 125 Amp. Auto Transformer Accessories. Engine 225 H.P. Climax Type R-225 on Skid. Alternator G. E. 125—KVA. 100 KW, 440 V. A. C. w/Transformer, Flexible coupling and skid base. House—10' x 18' wood frame, w/G.I. Roof and Siding on Skid. Engine—165 Hp Climax R-61 on Skid. Herndon Drilling Co., 421 Mayo Bldg., Tulsa. Phone 4-9700.

250,000 FT. 8⅝ o.d. pipe with collar and plain end. $1.00 per foot Oklahoma. Rogers & Lindquist, 620 Wright Building, Tulsa, Okla. Phone 3-2072—5-8850.

FOR SALE: Surplus Power Cylinder Heads, Clark RA Series, Worthington L-170, $95 Each, FOB South Texas. REFINERY MATERIALS CO., P.O. Box 14306, Houston 21, Texas.

FOR SALE: Star 45 Heavy Duty Spudder with 8800 Caterpillar Diesel Motor. Heavy Duty steel pole with roller bearing sand sheave and crown pulley. Three sheave casing block built into pole. No Tools. Priced right. C. H. Barker, Box 91, Toronto, Kansas.

FOR SALE

Several mud logging trailers completely equipped, sleeping quarters, gas detectors, mud analysis equipment, ultra-violet oil detectors, intercom systems, mud analysis, equipment, microscope, two way radio equipment. Price range $3500 to $6000 payment on delivery. West Texas inspection site. Will deliver to purchaser. **Box G-890, The Oil and Gas Journal, Tulsa, Oklahoma.**

REID MACHINE
and
SUPPLY CO.

OIL CITY, PA.

279-298 Elm St. Phone 6-6631

—formerly—

(JOSEPH REID GAS ENGINE CO.)

NOW OPERATING AS A GENERAL MACHINE SHOP

Specializing in

REPAIR PARTS

For

ENGINES & POWERS

Previously Furnished By

Joseph Reid Gas Engine Co.

EQUIPMENT WANTED

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

NOTICE: We buy. We sell equipment everywhere. If you want to sell or buy contact Pressey & Son, Pueblo, Colorado.

WANTED: 28L or 60 Bucyrus-Erie Spudder, with or without tools. Write Box 142, Jackson, Kentucky.

EQUIPMENT NOT IN USE: Did you find a buyer in this column for the equipment you have for sale. Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.

PERSONAL

ADVERTISER is very anxious to hear from William Clarence Holt, oil well driller, as he has information that should be of great value to him. Will be glad to hear from anyone who might know where he can be reached. Bernarr Macfadden, Daily News Building, New York, N. Y.

BUSINESS OPPORTUNITIES

WOULD LIKE TO INVEST large sum of cash and time with substantial supply, tool or service company wishing to expand and desiring the services of experienced man under 40, college educated, and quite a lot of cash. This is a real opportunity for a solid large company wishing to open a new division office but needing the right man and hoping he has money. Box G-889, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPLORATION SERVICE

DIRECT METHOD OF OIL LOCATION

A method that locates the oil body whether in a stratigraphic deposit or in a structural deposit.

Has been developed and proven during 49 YEARS of practical field research and operations.

NOT an experiment nor a theory.

For information address:

P.O. Box 1528, Tulsa, Oklahoma

FINANCING

PIPELINE FINANCING

We engineer, install and finance gas gathering and pipeline systems, compression plants and natural gasoline plants.

In conjunction herewith we purchase casinghead and natural gas. Profit participations in plant and pipeline operations available.

Box G-895

The Oil and Gas Journal

Tulsa, Oklahoma

ROYALTIES

FREE TAX INFORMATION for those desiring to sell their producing royalties, overrides or production. Robert L. Kinkaid, Box 26, Tulsa, Oklahoma.

ROYALTIES

I OFFER Non-Production Royalties large blocks in West Texas. Write for full details. P. O. Box 1242, Columbus, Ohio.

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column, use a Journal classified advertisement to find it. See box heading for classified rates, or write The Oil and Gas Journal.

LEASE AND DRILLING BLOCKS

TO A RESIDENT of Oklahoma will sell interest drilling well. Gas well drilled on lease had shallow oil showings. Want to drill, test, possibly sandfrac. Box 235, Wagoner, Okla.

CHEAP LEASES & ROYALTIES AVAILABLE: Due to other interests will sell my unproven acres to highest bidders. Wyoming—18,000 acres—leases. North Dakota—2,000 acres—leases. Colorado—480 acres—leases. North Dakota—800 acres—minerals. Write for list. Box G-887, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 125 acre Oil and Gas Lease in heart of activity, Shelby County, Texas. Price $5 per acre. Write for information to C. A. Parker, Box 507, Center, Texas.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

FEDERAL LEASE: 2560 acres in Johnson county, Wyoming. T. 46N. R. 78W. Surrounded by a major oil Co.'s 40,000 acre block. Write A. C. Trapp, 1477 Ridgeway Rd., Dayton, Ohio.

PUT YOUR MONEY to work. See A. L. Bowles, Ada, Okla., for Oil Investments & Drilling deals. Quick Action.

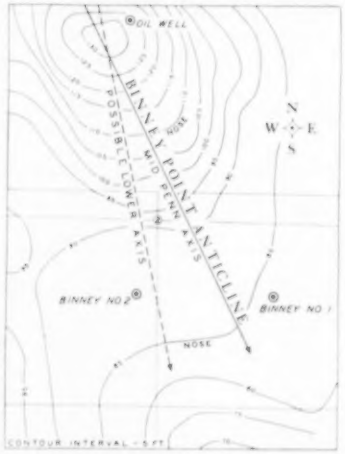
CALIFORNIA lease blocks: 17,000 acres Northwest Coalinga; 1,000 acres West Newhall. CECIL BLINN, 2911 Hermosita Drive, Glendale, California. Phone Citrus 3-2088.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

LEASES ROYALTIES

Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.



Oil and Gas Leases for sale or percentage drilling proposition on acreage in the above illustrating map of underground rock structure. Oil in Pennsylvania and Silurian formation in Illinois. Or will sell interest in Number 1 and 2 proposed drilling tests. **Box G-891, The Oil and Gas Journal, Tulsa, Oklahoma.**

REAL ESTATE

SPACE IS NEEDED: A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

"APARTMENT HOUSE"
THE FINEST IN LONG BEACH, CALIF.
16 fine large, near new, units, overlooking the blue Pacific Ocean on the finest street. 10 garages. Tenants pay own utilities. Permanent rentals, no vacancies. Income $24,000.00 per year. Asking price $215,000.00, some terms. Write, wire, phone, owner Carl Whitson, 3617 E. Ocean Blvd., Long Beach, Calif.

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ELECTRICAL CONTRACTORS
Industrial—Commercial—Distribution

W. L. Ratcliff — **506 Caddo St.**
P. O. Box 373 — **Shreveport, La.**

WILDCAT COMPLETIONS

(Continued from page 447)

Trego County: Davis Bros. 1 Buckholz, SE SE SE 7-11s-22w. Dry. TD 3,920 ft.

Pawnee County: J. A. Terteling & Sons 1 Wurn, NE NE SW 12-23s-16w. Dry. TD 4,186 ft.

NEBRASKA

Cheyenne County: Ed E. Hurley 1 Carlson, NE SE 17-14n-51w. Dry. TD 5,190 ft. "J" sand 5,121 ft.

Cook area: Pubco Development 2 Franzen, SW SE NW 25-15n-48w. IPP 500 BOPD, "D" sand discovery—new pool. "D" sand 4,307 ft. TD 4,322 ft.

Debby Oil & George & Downing 1 Hanson, SW SW NW 23-16n-53w. Dry. TD 5,750 ft. Skull Creek 5,612 ft.

Kimball County, Long area: Stanley T. Kiespert 1-A Donald Long, NW NW SE 10-12n-55w. IPF 185 BOPD, through 13/32-in. choke, "D" sand discovery—new pool. Skull Creek 6,306 ft. TD 6,311 ft.

Hilltop: Natural Gas & Oil 1 Larson, E½ SE SE 12-15n-56w. Dry. TD 6,460 ft. Skull Creek 6,411 ft.

Scotts Bluff County: Harry Royster 1 Hale, C SW SW 31-23n-54w. Dry. TD 4,835 ft. Skull Creek 4,849 ft.

SOUTH DAKOTA

Day County: Oil Ventures 1 Naessig, NE NE SE 32-121n-55w. Dry. TD 1,602 ft. Granite 1,550 ft.

NORTH DAKOTA

Slope County: D. D. Feldman, Worley & Harrell 1 Benz, SW NE 20-135n-98w. Dry. TD 8,974 ft. Mission Canyon 8,628 ft.

CALIFORNIA

Fresno County: Russell Giffen 62 32-F, 32-30s-16e. Dry. TD 10,042 ft.

Shell Oil Co. 368-16 Investment, 16-19s-15e. Dry. TD 5,364 ft.

Kern County: Ferguson & Bosworth 1-31 Anderson, 31-29s-21e. Dry. TD 1,786 ft.

Norris Oil Co. 86-X C.C.M.O., 32-28s-20e. Dry. Point of Rocks 3,575 ft., TD 4,032 ft.

Presley, Wattenbarger & Cook 1 P.W.C., NE SW 26-30s-29e, IPP 55 BOPD, 7/64-in. choke, 27° gravity, perfs. 3,169-3,299 ft., Santa Margarita 3,125 ft., Schist 3,175 ft., TD 3,300 ft. (New Schist pool in south Edison area.)

Richfield Oil Corp. D-2 San Emidio, 3-10n-21w. Dry. TD 9,967 ft.

The Texas Co. 1 Occidental-3, 26-26s-20e. Dry. TD 5,043 ft.

Los Angeles County: Standard Oil Co. of California 23 Elsmere Fee, 7-3n-15w. Dry. TD 2,821 ft.

Orange County: Pacific Suply Cooperative 2-6 Lamb, 6-6s-10w. Dry. TD 5,755 ft.

Tide Water Associated Oil Co. 1 Bryant Ranch, 21-3s-8w. Dry. TD 5,913 ft.

San Benito County: The Texas Co. 1 Nutting, 32-12s-5e. Dry. TD 9,032 ft.

Tulare County: McGreevy-Neary Oil Co. 1 Doe, 22-22s-27e. Dry. Basement 790 ft., TD 853 ft.

MONTANA

Big Horn County, S. Fork area: Stanolind Oil & Gas Co. 1 Crow Tribal Unit 3, C NW NE 30-3s-30e. Dry. TD 4,718 ft. Cambrian 4,685 ft.

Chouteau County, Goosebill Butte: T. F. Hodge & Associates 1 Olaf Olson, SW SW SW 11-27n-7e. Dry. TD 2,729 ft. Madison 2,728 ft.

Garfield County, Tee Pee Creek: Murphy Corp. 1 Government, CE½ NW NE 22-15n-37e. Dry. TD 6,424 ft. Mission Canyon 6,350 ft.

WYOMING

Campbell County, Mitchell Creek unit: Trigood Oil 2 Unit, C SW NE 33-53n-70w. IPP 125 BOPD, Minnelusa discovery. (New field.) Madison 8,430 ft. TD 8,581 ft.

Hot Springs County, North Hamilton Dome: J. Ray McDermott & Co., Inc. NW SW SE 34-45n-98w. Dry. TD 4,510 ft. Phosphoria 4,448 ft.

Niobrara County: Irving Pasternak and C. M. & W. 1 Government, C SW SW 25-40n-67w. Dry. TD 8,790 ft. Dakota shale 8,758 ft.

Sublette County: Charles Getzler G-1 Government, NE NW NW 9-28n-110w. Dry. TD 4,530 ft. Evanston 4,040 ft. (?).

N. Big Piney: Arthur B. Belfer S-1 Government Ruben, SW SE SW 9-30n-113w. Dry. TD 3,294 ft. "M" sand 1,632 ft.

UTAH

Grand County, Salt Valley area: King Oil 1 King, SW NW NW 32-23s-21e. Dry. TD 3,550 ft.

Moab area: Delhi Oil 1 Federal, NE NE NE 11-25s-20e. Dry. TD 7,435 ft.

Uintah County, Brush Creek: Cities Service 1 Government, SE SE SE 30-3s-22e (SLM). Dry. TD 5,522 ft. Weber 4,388 ft.

COLORADO

Adams County: Superior Oil 6604 State, SW NE SE 4-2s-56w. Dry. TD 5,717 ft. "J" sand 5,602 ft.

Petroleum Inc. 1 Moeller, NW NW SE 10-3s-57w. Dry. TD 5,570 ft. Skull Creek 5,558 ft.

Baca County: Southwestern Exploration 1 Rutherford, SE SE NW 5-29s-45w. Dry. TD 5,965 ft. Mississippian 5,922 ft.

Las Animas County, Garcia: Bruce Sullivan 1 Sandoval, NW NE SE 27-33s-62w. Shut down. TD 1,378 ft. Dakota 1,348 ft.

Logan County, Merino area: Trigood Oil 2 State, C SW SE 16-6n-54w. Dry. TD 5,088 ft. "J" sand 5,020 ft.

Ralph O. Brown and S. D. Johnson 1 State, NE NE NW 14-8n-51w. Dry. TD 4,592 ft. "J" sand 4,453 ft.

Pubco Development Co. 1 Hoxie State, C NW SE 25-8n-54w. Dry. TD 5,107 ft. "J" sand 4,999 ft.

Anschutz Drilling 1 Manuello, C SE SE 30-9n-51w. Dry. TD 4,625 ft. "J" sand 4,488 ft.

N. Johnson Hill area: Skelly Oil 1 L. F. Johnson, NW NW SW 20-8n-54w. Dry. TD 5,437 ft. "J" sand 5,310 ft.

Moffat County, SW Elk Springs: Tom Palmer 1 Government, C NW NE 34-4n-99w. Dry. TD 5,689 ft. Weber 5,520 ft.

Morgan County: S. D. Johnson et al 1 Peterson, NW NW NW 1-1n-57w. Dry. TD 5,500 ft. "J" sand 5,408 ft.

Twin "T"-Brown & Barnes 1-10 Wm. Nicklas, C SW NW 10-6n-57w. Dry. TD 7,204 ft. Base Lyons 7,170 ft.

Washington County: Kejr-Braden & Hoover 1 Shay-Carter, NW NW SE 21-2s-53w. Dry. TD 4,997 ft. Skull Creek 4,983 ft.

Al Ward & Son 2 Gebauer, NE SW SE 5-1n-53w. Dry. TD 5,441 ft. Morrison 5,283 ft.

Weld County: Midland Oil Co. 1 King, C NE NW 27-1n-61w. Dry. TD 6,900 ft. "J" sand 6,820 ft.

Shell Oil Co. 1 McEndaffer "B," C NE NE 11-11n-56w. Dry. TD 6,135 ft. "J" sand 5,963 ft.

MANITOBA

Canadian Devonian 11 Hepburn, LSD 16, 23-10-26w1. Mississippian oil well. TD 2,029 ft.

SASKATCHEWAN

Hudson's Bay-Tide Water 5 Chaplin Lake, LSD 6, 20-20-7w3. Dry. TD 3,653 ft.

Wilrich-Trans Era 2 Strat test, LSD 7, 29-48-23w3. Dry. TD 1,773 ft.

Socony-Sohio 1 North Waldron, LSD 5, 11-22-4w2. Dry. TD 3,270 ft.

Sohi 11-15 Creelman, LSD 15, 11-10-11w2. Dry. TD 4,504 ft.

ALBERTA

Anglo-Triad 33-10 Alpen, LSD 10, 33-62-21w4. Dry. TD 3,900 ft.

California Standard 14-11 South Falun, LSD 14, 11-45-27w4. Blairmore sand gas well. PBTD 5,210 ft. TD 7,560 ft.

1 Faust, LSD 9, 14-71-11w5. Dry. TD 3,742 ft.

Imperial 10-34 Joseph Lake, LSD 10, 34-50-22w4. Dry. TD 3,416 ft.

Imperial 15-8 Helliwell, LSD 15, 8-61-24w4. Dry. TD 3,475 ft.

California Standard 5-14 September Lake, LSD 5, 14-67-25w4. Basal quartz gas well. PBTD 3,005 ft. TD 4,590 ft.

BRITISH COLUMBIA

Gulf States-Fargo 2 Gundy Creek, unsurveyed territory, on Permit 176, 10 miles west of Mile Post 109½ on Alaska Highway. Small gas well. TD 4,884 ft.

Reed Executive Addresses Houston Industrial Men

Highlighting the problems encountered by corporate management in developing executive personnel, Jack A. Grundy, assistant factory manager at Reed Roller Bit Co., spoke recently at a luncheon before Houston industrial distributors.

In his talk, Grundy emphasized the outstanding character of the recent Southwest Executive Development Program sponsored by University of Houston. This program deals with community relations, managerial organization, communications, marketing, labor relations, accounting, executive action,

EQUIPMENT MEN

Darling Names Engstrom to Manage Midwest Sales

Darling Valve & Manufacturing Co., Williamsport, Pa., has announced the appointment of Bertil E. Engstrom as Midwest regional sales manager.

Engstrom joins Darling Valve after 6 years with Minneapolis - Honeywell, where he served as assistant sales manager, and more recently as regional sales manager. He attended University of Wisconsin, Illinois Technical Institute, and Duluth Business University. He will head Darling Valve sales in roughly a dozen states extending from the east Ohio border to the west border of the Dakotas, to the south border of Kentucky.

Maloney-Crawford Sells Canadian Subsidiary

Maloney-Crawford Tank & Manufacturing Co., Tulsa, has sold the physical assets of its Canadian subsidiary, Maloney-Crawford of Canada, Ltd., to George M. Cheatham, of Calgary, Alta., effective January 1, 1954, according to S. P. Wallace, president of both companies.

Cheatham, who has been vice president of Maloney-Crawford of Canada, Ltd., has formed a new company, Maloney-Crawford Tank & Service Co., Ltd., to serve as a distributor of Maloney-Crawford tank, separator, and treater product lines.

The new company will continue to maintain stocks at strategic Canadian points. Headquarters will be at Edmonton.

B.S.&B. Appoints Two New Branch Managers

Floyd C. Myers, manager of oil field sales and service division, of Black, Sivalls & Bryson, Inc., has announced the appointment of two new managers of recently opened branches in southern Louisiana at Harvey and Lake Charles.

R. R. NOLAND

LOUIS MORGAN

Ray R. Noland, former service man at Houston, has been appointed manager of the new Harvey branch; while Louis Morgan, formerly at Lafayette, has been named manager of the Lake Charles branch.

The two branches have been opened to provide better service to growing activity in southern Louisiana oil and gas fields.

Fabricators of oil-field equipment for more than 60 years, B. S. & B. manufactures a complete line of oil-field processing and storage equipment, automatic controls, safety heads, and custom-fabricated heavy pressure vessels of all types. Branches and sales offices are located at 55 points throughout the oil country.

Mayo Coffee Club Holds Annual Party

Recently the Tulsa "Coffee Club" held its annual meeting at the Mayo Hotel, Tulsa, and nearly a hundred business men associated with the oil industry attended. Pictured above are Frank Weimer, independent producer; Dave Beech, of Beech & Talbot; Rainey Elliott, general manager, Jones & Laughlin Supply Co.; Russell Hunt, vice president, First National Bank of Tulsa; John D. Mayo, of Mayo interests; Jack Shakely, Oklahoma-Mississippi River Products Lines, Inc.; and Barton Myers, independent producer.

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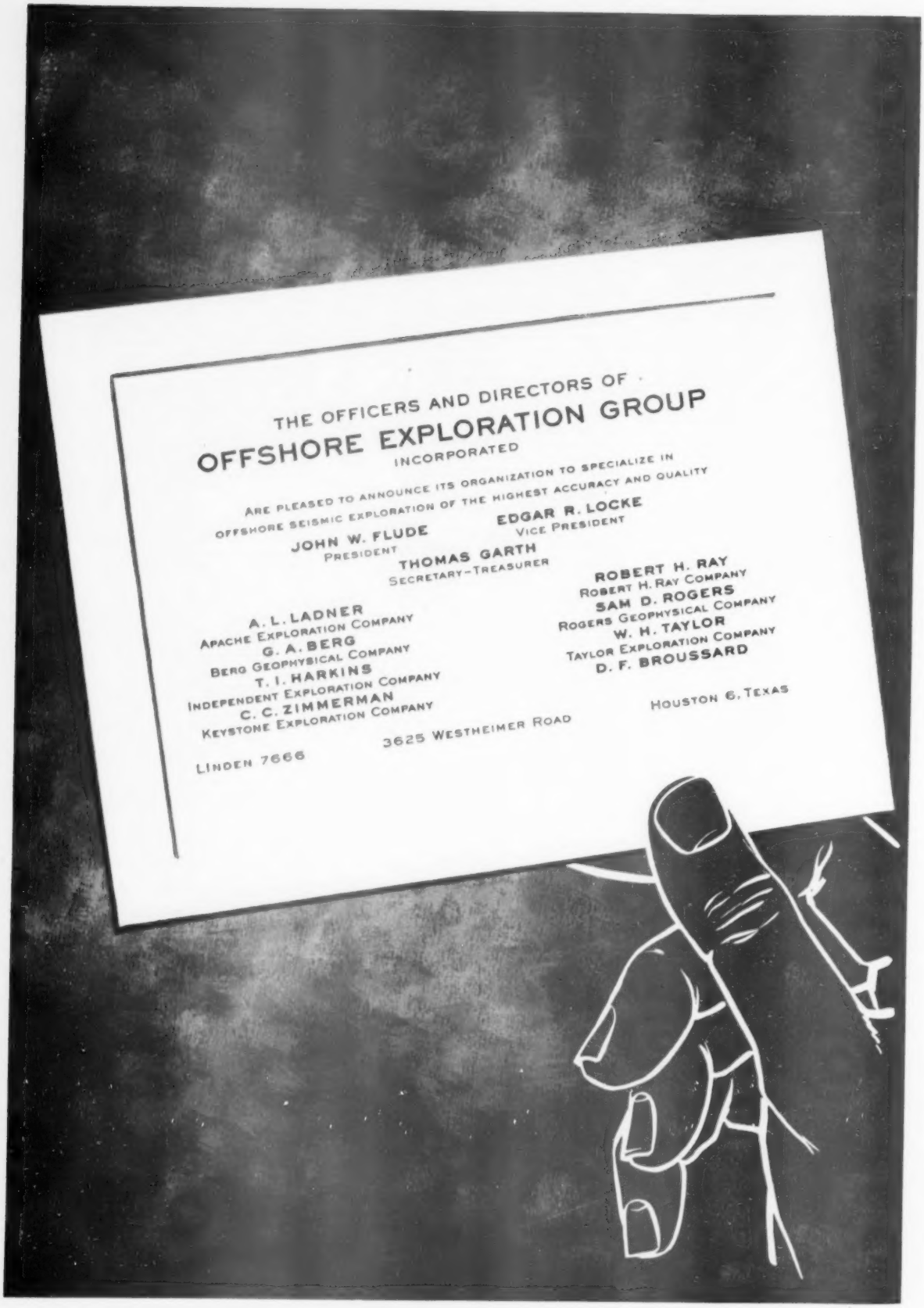
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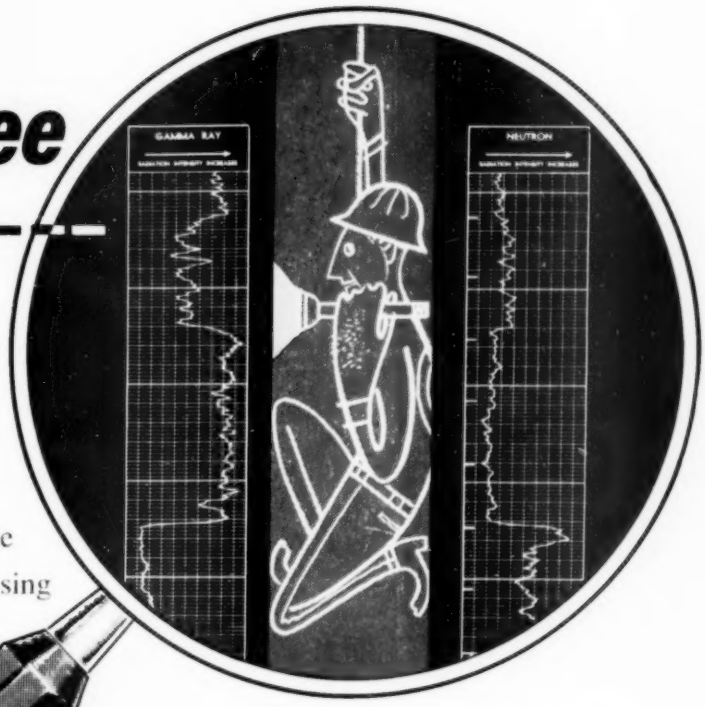
More than you could see if------



Welex radioactivity well logging (WSI licensee) gives you type, depth and thickness of formations, indicates presence of fluids and correlates your casing collars to each formation.

FASTER — Welex simultaneous logging plus fast, efficient crews cuts your "down-time" in half.

BETTER — Clear definitions of repeatable curves adaptable to quantitative interpretation, give you the most modern R/A log.

SURER — Correlating your casing collars to each formation with a Welex log definitely locates the zones you want perforated.

For the BEST in PERFORATING and R/A LOGGING

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Controlled heat treating puts "muscle" in your bits

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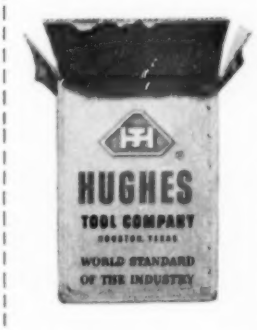
In perfecting these operations Hughes Tool Company has developed the industry's most advanced heat treating processes and equipment. *Today, Hughes ranks as the largest deep case carburizer of manufactured products in the world.*

Back of every Hughes bit you run is the Company's 45 years' experience in making the industry's finest rock bits.